EXCAVATING ENGINEER

FOUNDED 1905

L. C. Curtis & Sons of Coran, Montana, employ a 3/8-yard dragline to feed gravel for a dam construction project to the loading bin of their washing and screening plant.

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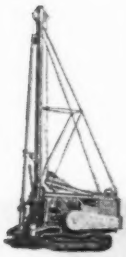
Vol. XXXVII March 1943 Number

KEEP 'EM DRILLING



UNCLE SAM expects you to keep your drilling equipment at work. Doing so plays its part in keeping his factories working, his workers fed, his army and navy fighting. He's depending upon you to do the most with what you have, so that he'll have more to give to his forces.

Keep your drill performing better, make your equipment last longer:

1.

Watch your wire line; be careful to avoid kinks; keep it lubricated.

2.

Watch all bearings; see that they are tight; remove shims if necessary.

3.

Watch your drilling motion; keep it steady; maintain proper tension on your line.

4.

Watch your brakes and clutches; keep them carefully adjusted to improve operation and increase life of wearing parts.

5.

Watch your tools; don't feed them out too fast; it's better to drill with a tight line and let the tools reach out on the stretch and spring of the line and the shock absorber.

H 39

DRILL FOR ★ ★ ★ VICTORY

Bucyrus·Eri

EXCAVATING ENGINEER

FOUNDED 1905

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Why PREforming Conserves Steel, Makes Wire Rope Last Longer

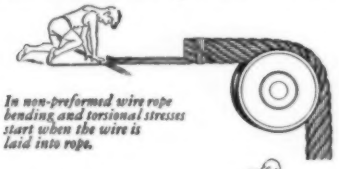
(Note: More and more wire rope users change to PREformed rope each year. During peacetime the reasons for changing from ordinary to PREformed wire rope were primarily two: the cost is lower; PREformed is easier to handle.

Today, with our nation at war and with steel at a premium, there is another and most important reason for using PREformed. It lasts much longer under high speed, severe bending and continuous operation. PREforming thus conserves steel. It conserves workmen's time; rope changes are less frequent. It reduces the accident potential; there is no wickering to harm hands or damage sheaves.)

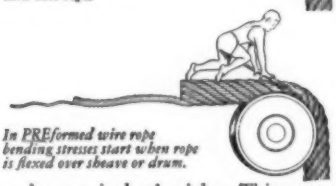
There are two kinds of wire rope. One is called Regular, or ordinary, wire rope. The other is known as PREformed.

In ordinary rope wires are held together under tension. The wires are laid into the rope by bending them to the desired shape. Bending and torsional stresses thus remain in the rope . . . are kept under control by seizing the ends of the rope.

If the wire breaks, it immediately wickers. If the seizing breaks, the strands



In non-preformed wire rope bending and torsional stresses start when the wire is laid into rope.



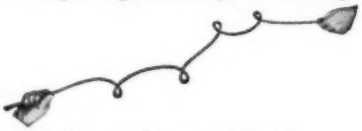
In PREformed wire rope bending stresses start when rope is flexed over sheave or drum.

and rope wire both wicker. This causes damage and delay. In PREformed wire rope, the strands and wires are preshaped to the exact curvature they will take in the finished rope. Bending and torsional stresses are eliminated (except of course when the rope bends over a sheave). If a wire breaks, it does not wicker but remains relaxed, thus causing no delay or damage.

Advantages of PREforming

PREformed wire ropes are like shoes that have been broken in. Instead of being stiff and unwieldy, they are flexible, easier to handle.

They are better adapted to bending and spooling, also. They resist kinking



when the rope is not under load.

PREformed wire ropes are easier to handle also because broken wires lay flat.

And finally, most important, PREformed wire ropes have greater resistance to bending and fatigue. This is

another way of saying that they last much longer, do a better job when the pressure is on, as it is today in war production.

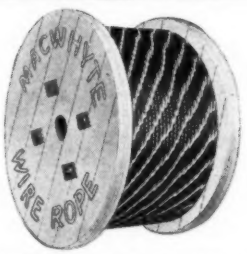
When next you need wire rope, consider seriously the purchase of PREformed wire rope: Today the job we must all do is the "best" job possible. When it comes to wire rope there is no question as to which does the "best" job. It's PREformed.

Consult with Macwhyte

Don't overlook the help that Macwhyte engineers will gladly give you on any wire rope problem. Their advice gained from many years' work on all kinds of jobs is yours for the asking. Let us know the kind of work to be done; we will tell you the rope best suited for the job.

And this we urge you to do: take extra care of your present ropes. Inspect them regularly; lubricate them often. By so doing you can make them last longer and thus aid the war effort. That's what you want; that's what your country asks of you.

This is Number 13 in a series of informative articles prepared by the Macwhyte Company to help wire rope users obtain better and longer service from ropes on the job. All articles in this series are available on request.



MONARCH Whyte Strand PRE-FORMED WIRE ROPE

. . . Macwhyte premier wire rope, famous for its strength, toughness, and internal lubrication.

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Just What You Need for PAVING BREAKING

C7 in action

WHATEVER your requirements, there is a Cleveland Paving Breaker exactly suited to the job. The 80 lb. C7 is the right tool for average work—two C7's run from a No. 85 compressor. For heavier work, use the C9; it is 2 lbs. heavier, but uses no more air. C9 is a slugger that licks the toughest, reinforced concrete. For light work, trimming, etc., try the C10, the little fellow with the big wallop. Three C10's run from a No. 85 compressor. Model C11 is the 58-pound machine with the long stroke and the heavy "slugging" blow—a favorite wherever used. Extremely economical as to air consumption.

Among accessories you can't beat "Clevaloy' chisels, moils and miscellaneous paving breaker tools. Try the 14" narrow chisels, they cost no more than moils, but cut faster. Then specify tough, durable Cleveland "Veribest" air hose. Finally, connect it with Cleveland quick-acting Type "A" hose couplings, and you are all set for the toughest paving breaker job.

Ask for Bulletin 128 on Cleveland Paving Breakers

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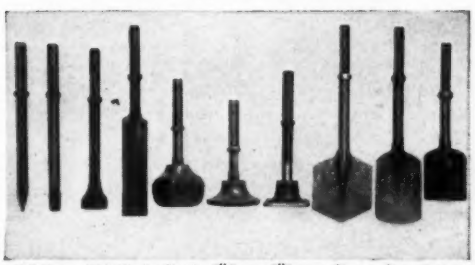

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LEADERS IN DRILLING EQUIPMENT

Lifeline To Alaska

This concluding installment of the Alcan article started in our February issue continues on the job observations of the author who covered most of the main contracts on this project with note book and camera

By HOWARD V. PEHRSON

WHEN, IN AUGUST, the Army engineers determined to push through the Alcan highway over the route of the "tote" road to assure completion of a highway that could carry truck traffic during the winter months, all contracting firms operating on the project shifted from the commercial highway to the 40-foot right-of-way cleared by the men in khaki. There was no abrupt stoppage of work as the original plans were altered in the field to concentrate activities on the "tote" road. Engineers bent the line of the commercial highway to a junction with the "tote" road and followed the route of the "tote" road as far as was practical thereafter.

As originally built by the Army, the "tote" road was 20 feet wide with a 40-foot right-of-way. It had been thrown through the wilderness hastily with no great attention paid to slopes or ditches. Contractors first started widening out the right-of-way over the "tote" road, and then shouldering out the roadbed to 24 feet. Continued mild weather well into the winter afforded an opportunity to shoulder out the highway to the standard 36-foot width through many areas. Final grading, shaping and graveling also was completed over many miles of the Alcan highway.

The highway used during the past winter for military traffic between Dawson Creek and Fairbanks is a good, serviceable road. Its minimum width is 20 feet, but over many sections it provides the finished 36-foot roadbed width. The snow filled in between the aggregate and compacted, forming a smooth road surface. Although some of the curves and grades require caution on the part of the drivers, the highway is not a dangerous road.

Sub-contractors on Okes Section

Under the Okes management contract on the 260 miles of Alcan highway through the forests between Fort St. John and Fort Nelson, and for some distance beyond Fort Nelson, 13 sub-contractors participated in this section. Among the first of these sub-contractors to move into tent camps along the Peace River after the trail-busting crews of the Standard Salt and Cement Company, Duluth, had started building mess halls and clearing right-of-way, was M. G. Astelford, Inc. of Minneapolis.

• The author, Howard V. Pehrson, poses beside a freshly-killed moose just before it made its debut on a camp dinner table.

Into the scrub growth north of Fort St. John on June 24, tractors and scrapers operated by Astelford's crews moved and started grading on the PRA road. Until early in August, Astelford worked with tractors, scrapers and elevating graders on the PRA highway not far north from the base camp at Fort St. John. When the Army ordered operations concentrated on the route of the "tote" road, Astelford moved his men and equipment more than 200 miles north and established camp at Milepost 245. Operations on the "tote" road during early fall and winter have principally been widening out the road, reducing grades and removing curves.

When the writer visited construction camps on the Alcan highway in November, Astelford's crews were working with crews of Reese & Olson of Marshall, Minnesota, and others building up the fill for the new bridge over the Muskwa river.

Reese & Olson, also grading contractors, moved into camp on the Okes sector of the Alcan highway in June. Scrapers and elevating graders moved dirt at Milepost 35 north of St. John as early as July 1, working stretches of the highway all the way up to Milepost 188. Fill for the new grade over sections worked by Reese & Olson has either been excavated from side borrow with scrapers or picked up with elevating graders.

Reese & Olson also worked with Thomas Brothers of Foley, Minnesota, and Leguil & Brown of Madison Lake, Minnesota, in improving the grade of the "tote" road between the Peace River ferry landing and Fort St. John. Thomas Brothers started operations on this section of the "tote" road on June 20, and as they, with the other two contracting firms completed this phase of the operations, the Army and the PRA assigned 20-mile sections of grading to each of the contractors. The second contractor started his grading where the first's operations ended and the third where the second would be completed. Over this 60-mile stretch of the highway, the contractors used

scrapers to build up the roadbed for a new highway from side borrow. As the fill for each 20-mile section was completed, the contractor would leapfrog up the highway for 40 miles and start operations on a new 20-mile section.

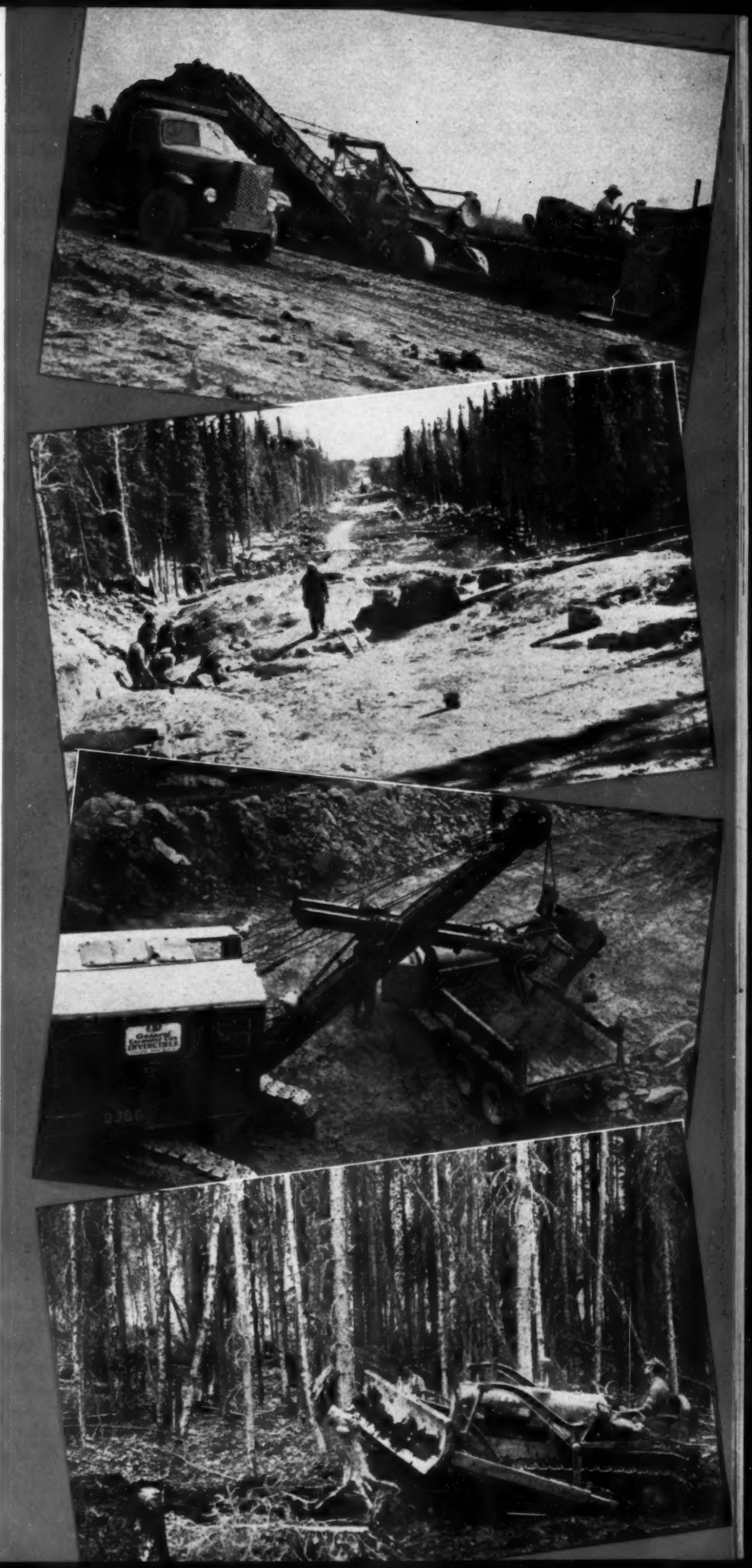
Eight scrapers—three Bucyrus-Erie, three LeTourneau and two Heil—have been used by Thomas Brothers in the grading operations. Tractors have included one Allis-Chalmers, three International TD-18's and three Cletracs. Two Baker bulldozers and one Bucyrus-Erie bulldozer have been used as well as a Caterpillar blade, two Austin-Western 77 patrols and an Austin-Western elevating grader.

Sorensen & Volden Operations

Since August 14, Sorensen & Volden of Albert Lea and Balaton, Minnesota, have had their scrapers working in clay on grading operations. This firm started work on the PRA road at Milepost 5 just beyond Fort St. John, subsequently moving to Milepost 225 and then 35 miles west of Fort Nelson. Winter camp was established at Milepost 217 and the contractor expects to work from this point next spring, straightening and widening out the "tote" road.

Sorensen & Volden have used 12 tractors, including Caterpillars, Allis-Chalmers and Internationals; five scrapers, including four LeTourneau and one Gar Wood; three Bucyrus-Erie bulldozers mounted on Allis-Chalmers and International tractors; one American Gopher 1¼-yard shovel; one Adams road patrol and one Caterpillar road patrol.

Early in July, the Volck Con-



• Starting at top, (photo 1): A Caterpillar tractor tows an elevating grader over a high spot on the Alcan highway. (2) An early general clearing and grading scene on the new route. (3) Roverud Brothers employ a General Excavator "Invincible" shovel to load out rock from their stone pit to a Ford truck. (4) Land clearing operations on a section of the Alcan highway are tackled by a Bucyrus-Erie Bullgrader mounted on an International tractor. (Photos 1, 2, 4 courtesy Public Roads Administration.)

struction Company of Rice Lake, Wisconsin, started application of select material over completed sections of the new grade near Fort St. John. In September the firm moved camp to Milepost 95, producing crushed rock and aggregate for surfacing on the "tote" road, and, from pits near the Sikanni and Muskwa rivers, aggregate to be used in concrete work for new permanent bridges. The Volck Construction Company has employed an average of 140 men, working, as have other crews on the highway, two 11 hour shifts seven days per week.

The stone from which aggregate and select material has been produced is a peculiar mixture of shale, conglomerates and hard rock with a showing of clay. When shot, this rock doesn't break uniformly, making shovel loading difficult.

During the past winter, the Volck Construction Company produced and stockpiled crushed rock for use this spring, as well as for maintaining the winter road between Mileposts 78 and 131. Most winter and summer maintenance on the highway is done with motor patrols.

Included in the inventory of equipment used by the Volck Construction Company on their sections of the Alcan highway project are the following: Lippmann gravel plant; Lippmann washing plant; Pioneer primary rock crusher; Universal crushing plant; P&H ½-yard shovel; P&H 1¼-yard shovel; Northwest 1-yard shovel; two Bucyrus-Erie bulldozers mounted on International tractors; two LeTourneau bulldozers with Caterpillar tractors; 38 3-yard dump trucks including Fords, Chevrolets, Dodges and Internationals; two Galion road patrols; two Caterpillar No. 11 patrols; one Caterpillar 112 partol.

Crushers were powered with Caterpillar diesel units. Rock drills used on rock work were Chicago Pneumatic, Cleveland, Sullivan and Thor. Chicago Pneumatic and Gardner-Denver compressors furnished the power.

• A Caterpillar tractor, equipped with a LaPlant-Choate bulldozer, removes a sand bar to make room for pontoons that will support a bridge at this point.

• Portion of the Alcan highway between Fort St. John and Fort Nelson. Well drained and graded, it doesn't look much like a pioneer road only four months old.

• Borrow, from a pit operated near Fort St. John by the Southern Minnesota Construction Company, is loaded out to a Ford truck by an American Gopher shovel.

• Crushing unit and loading bin on a Pioneer gravel plant owned by Roverud Brothers of Spring Grove, Minnesota. Aggregate in a hurry was made possible by these portable plants.

Typical Surfacing Contract

Many of the contracting firms who are building the Alcan high-

way are combinations of several individual contractors. Adolphson-Huseth-Layser & Welch formerly operated as individuals from Thief River Falls, Minneapolis and Annandale, Minnesota. Holding contracts for surfacing, the combine was the first firm on the highway under the Okes management contract to move material. Equipment was on the job early in June and on June 23, Adolphson-Huseth-Layser & Welch started graveling the "tote" road for the 16-mile stretch between the Peace River ferry landing and Fort St. John. Select material for this work was removed from a borrow pit adjoining the road on the banks of the river.

After completing graveling the "tote" road from the Peace River to Fort St. John, the firm moved in with several other contractors operating from borrow pits near the base camp, subsequently moving north to Milepost 37 and working up to Milepost 79 producing select material from two borrow pits. At one of these pits, sandstone was blasted in the quarry, loaded without crushing to trucks and broken up by tractor treads on the highway.

During this winter at Milepost 79, Adolphson-Huseth-Layser & Welch crushed and stockpiled 500,000 cubic yards of rock for surfacing this spring. Like other contractors, this firm operates on a 'round the clock basis, every day of every week.

During their operations on the Alcan highway Adolphson-Huseth-Layser & Welch have used two Speeder ¾-yard shovels; one Speeder ½-yard shovel; three Gar Wood scrapers with International TD-18 tractors; one Bucyrus-Erie bulldozer with International TD-18 tractor; one LeTourneau scraper with Allis-Chalmers model L tractor; two Baker bulldozers on Allis-Chalmers model L tractors; one Allis-Chalmers K51 motor patrol; one Adams motor patrol; one Universal crusher; 68 Ford, Chevrolet, International and Mack trucks; one Davenport tandem sheepsfoot roller; one Telsmith 3018 crusher; one mobile machine shop; three pickup

(Continued on page 151)

The group of workmen shown were left temporarily stranded the wrong side of the river when the 300-mile middle section the Peace river bridge was pushed out by the ice.

• A Ford truck, equipped with special Thornton drive and Anthony hoist and body, dumps its load of rock into a crushing plant hopper.

• Army engineers use standing timber and a LeTourneau crane to construct a bridge across one of the many Alaskan creeks along the route.

• A Lima shovel loads out borrow to a Ford truck in Southern Minnesota Construction Company's gravel pit near Fort St. John.

How Much Dormant Scra

Your discarded equipment and miscellaneous scrap is needed NOW for Victory. Here's how you can turn idle metal into shells bound for Berlin and Tokyo

WHAT ARE you doing about the Scrap Drive? Of course you did your share and more last fall during the organized campaign. At home you got out all the old junk which had been lying around unused and forgotten—old golf clubs, a worn out electric iron, that discarded coal shovel—and turned it over to the Boy Scouts with a virtuously patriotic feeling. And, perhaps an impressive tonnage of obsolete equipment, abandoned rails, and miscellaneous metal items was turned over to the Industrial Salvage Section by your organization.

That was all to the good, but it isn't enough. Scrap collecting is a continuous job. Keeping a continuing flow of scrap from home, farm and industry into channels for conversion into guns, ammunition, planes, motorized equipment and all the rest of the war materiel needed so desperately to keep our armed forces supplied, is a day-after-day, unremitting duty for all of us.

By now everyone is familiar with the reasons why scrap is so important. As a reminder we'll repeat a few facts. Each individual American soldier requires an average of 4,900 pounds of steel, in the form of carried or supporting equipment. In World War I he needed only 90 pounds.

A Civil War infantry division of 15,000 men could shoot about three truckloads of ammunition a minute. In World War I, an infantry division could shoot about 50 truckloads a minute. In the present war, one division can fire 170 truckloads of ammunition per minute. Think of it! A truck piled high with 5,000 pounds of metal would last only long enough for your watch to tick off one-third of a second. And this tremendously increased need for metal in manufacturing ammunition does not consider the far greater use of planes, tanks, ships, anti-aircraft guns and other machinery in this war.

"He's my salvage detector!"

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Importance of Scrap

Here's the important thing to remember about the need for scrap. Steel normally is made by melting together pig iron (about 50%), scrap generated in the steel plant in the process of steelmaking (about 25%), and scrap purchased from outside junk sources (about 25%).

Steel can be made 100% from pig iron. Or it can be made 100% from scrap. But every ton of steel scrap takes the place of one ton of pig iron, and to make one ton of pig iron takes two tons of iron ore, 1.2 tons of coal and ½ ton of limestone.

Our annual war steel capacity is 90,000,000 tons. Only scrap can make it possible to reach and pass this figure, for to supply enough pig iron to produce this tremendous amount of steel without scrap, would require 180,000,000 tons of iron ore, 108,000,000 tons of coal and 45,000,000 tons of limestone. There are simply not enough mining transportation and plant facilities to supply and handle all this tonnage. *Scrap must fill the gap.*

Where, you may ask, do I as a contractor fit in the picture? Local salvage committees take care of scrap collections from homes; rural and county salvage committees function in the country; industrial committees collect industrial scrap. But the contractor in this respect is "neither fish nor fowl"; he has a tremendous tonnage of valuable scrap in the form

Have You?

of "dormant scrap" which ought to be turned in, but to a large extent hasn't been.

What is "dormant scrap"? It is defined as "obsolete machinery, tools, equipment, dies, jigs, fixtures etc., which are incapable of current or immediate future use in war production effort because they are broken, worn out, irreparable, dismantled or in need of unavailable parts necessary to practical re-employment."

Scrap Possibilities

This dormant scrap of the construction industry includes such obsolete and discarded items as:

- Power excavating equipment
- Shovel dippers, clamshell and dragline buckets
- Tractor equipment
- Concrete mixers and pavers
- Transmission belts
- Road rollers
- Finishing machines
- Wire rope
- Cement tubs
- Steam boilers
- Chains and hooks
- Miscellaneous tools
- Engines
- Conveyors
- Aggregate measuring bins
- Scarifiers
- Drills and drilling equipment
- Steel track, pipes, and drums

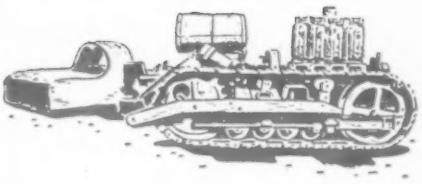
The list isn't complete by any means, but you can go on from there. Prepare a complete inventory of idle material and equipment. Tag everything not in use. "Sell" your whole outfit on the need to scrap unusable material and equipment. The rule which has been recommended by the Industrial Salvage Board to follow in determining borderline cases is: "If it hasn't been used for three months, and if someone can't prove that it's going to be used in the next three—find a use for it or scrap it!"

Much equipment, valuable only as scrap, is in dealers' hands or is lying abandoned, and all but forgotten, in contractors' yards, mines, worked-out gravel pits and quarries, or quietly rusting away in some out-of-the-way location. Dig it out!

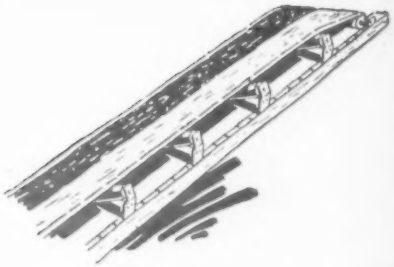
Perhaps you have a sentimental attachment for that old steamer which started you on your career 20 years ago. But now is no time for sentiment; scrap it: The "three month" rule quoted above is a good one to follow. Of course, any usable parts should be sal-

(*Continued on page 157*)

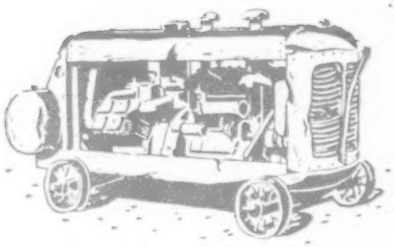
Here's What to Look For



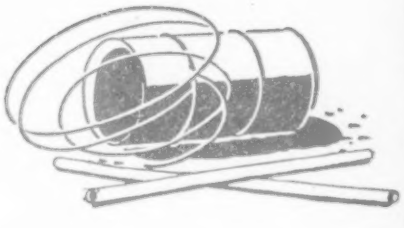
SHOVELS, BULLDOZERS, DERRICKS . . . tractor plates, rollers, and other parts . . . buckets, chains and cables. Remember—a 4,000 lb. "block-busting" bomb calls for half a ton of steel scrap. Turn in every other kind of material, too—don't let a single factory close down for lack of metal!



CONVEYORS of all kinds — bucket, fabric, rubber and fabric. Also old sheaves and pulleys. The Japs hold 97% of the world's rubber supply. Scrap rubber must see us through. Every ounce of rubber you ignore helps Hirohito and Hitler.

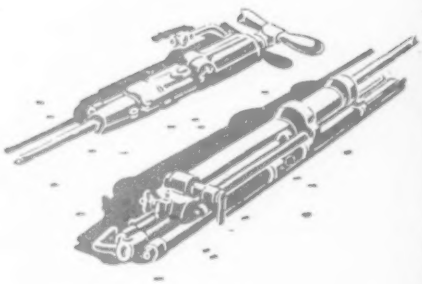


PUMPS, COMPRESSORS, ENGINES and their parts . . . pistons, bearings, cylinders, valves. Rout out old-style, outmoded equipment. Don't hoard this valuable scrap — it's worth its weight in Japs!



OLD PIPES, DRUMS, short lengths of pipe, broken rubber hose, battered grease drums, old truck tires, odds and ends of bars for reinforced concrete. A 50-lb. steel drum yields scrap enough for one .50-caliber machine gun!

ROLLING STOCK . . . odd length rails, narrow gauge equipment, car wheels, axles, old batteries from electrict mules. Every bit of metal is needed *right now!*



AIR TOOLS . . . paving breakers, jackhammers, drills and parts. Round everything up—no matter how small. It takes only half a pound of scrap for a hand grenade!

Here's What to Do . . .

Appoint one man as Salvage Manager for your company. Give him authority to **act** — to condemn old equipment, to move material, to collect scrap of all kinds. Have him separate all scrap by type. Then move it promptly through your regular scrap dealers. Don't wait — start rounding up scrap **now** — and keep it moving until the war is won!

Barber-Greene Representatives
AT YOUR SERVICE

B-G representatives can be of valuable assistance to you during the present emergency. **PARTS** Many carry in stock the B-G repair parts most frequently required. Others can assist you in ordering parts. **MAINTENANCE** They will gladly advise you on general maintenance. Many are equipped to bring your machine in and completely overhaul it. **RENTAL** B-G representatives are glad to assist you in locating machines for rental or will assist you in renting a machine which you have idle. **ENGINEERING SERVICE** Your B-G representative will gladly give you the benefit of his experience in any proposed changes in your material handling layout. **NEW MACHINES** New Barber-Greenes are not available except on very high priority. If you are planning a job which will carry such a priority, your B-G representative will give you every possible assistance.

BRANCH OFFICES
WASHINGTON ATLANTA
BIRMINGHAM CAMBRIDGE CHICAGO
CLEVELAND DETROIT MILWAUKEE

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ALBUQUERQUE Contractors Equipment & Supply Company
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RALEIGH Carolina Tractor & Equipment Company
RAPID CITY Rapid City Implement Company
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ARMY E NAVY

BARBER GREENE
AURORA, ILLINOIS

42-4

Chicago Scrap Handler

Apex Iron & Metal Company of Chicago employs three magnet cranes to hurry about 50,000 tons of scrap on the way to mid-west steel mills each year

SCRAP TO SLAP the Japs is something more than a pat phrase to the Apex Iron & Metal Company of Chicago. Since 1924, handling scrap has been the company's business. Efficient and economical reclamation of the salvaged material purchased from industrial sources, automobile grave yards and building demolition jobs has always been a "must" as far as the company is concerned.

However, the nation's current need for scrap to keep steel mills running full blast has added a new incentive to Apex Iron & Metal's scrap handling activities. Currently, the company is doing its part by providing several prominent mid-west steel plants some 50,000 tons of industrial scrap a year.

Star of Apex Iron & Metal Company's scrap sorting and handling equipment line-up is a Bucyrus-Erie 22-B magnet crane. Swinging a 45-inch magnet at the end of its 45-foot boom, this crawler-mounted crane roves the 140,875 square feet of the company's 245'-x575' storage yard to perform various loading, unloading and sorting duties in jig time.

The first crane of its type to see duty in a Chicago scrap yard, this mobile scrap handler is hanging up a good performance record as it works 20 hours a day, moving about 1,200 tons of scrap iron per six-day week. Apex Iron &

(*Continued on page 157*)

• **Top: The 600-pound bales of scrap are loaded to waiting gondola cars via this conveyor. Center: A Bucyrus-Erie 22-B magnet crane was the answer to Apex Iron & Metal Company's scrap sorting and handling problems. Bottom: Scrap bales leave the metal baler on their way up the conveyor.**

Tideland Shipyard

Barrett & Hilp of San Francisco employ shovels, draglines, and scrapers to turn a mud flat area into a modern shipyard

By WILL WILLIAMS

EXCAVATING contractors and dirt moving equipment played a vital part in the preparation of a new shipyard being used for the construction of concrete ships on the San Francisco Bay peninsula.

The new shipyard turns out huge concrete barges, built to the shape of ocean ships and designed for world travel. The barges are pulled by giant seagoing tugs. There are crew quarters and machinery on the barge decks and every bit of space inside is used in cargo holds.

A contract awarded by the United States Maritime Commission for the construction of 26 of these concrete barge ships was landed by the San Francisco general contracting firm of Barrett & Hilp early last year.

Barrett & Hilp handled the whole job from creation of the shipyard out of mud flats to production of the finished barges. This company also supervised construction of the yard and handles every phase of building the ships. The sub-contract for excavation work is held by the C. Dudley De Velbiss Company.

Concrete ships are not a new idea; but practical development of the idea is new. Generally speaking the San Francisco Bay area has become a proving ground for the development of practical new ideas. With shipyards at Richmond, Oakland, South San Francisco, and more recently at Sausalito, turning out new type "plain jane" cargo vessels with assembly line methods; San Franciscans were not too surprised by the construction of concrete ships.

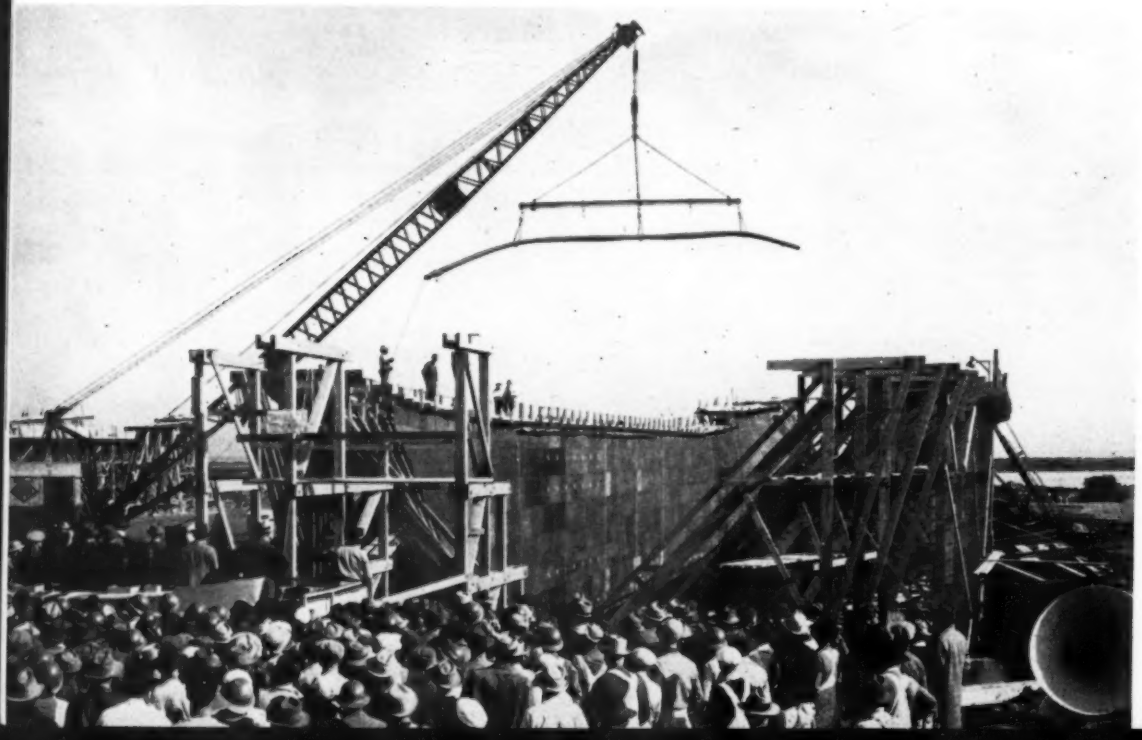
Improvement of Concrete Ships

Ships of this type were tried during World War I, but did not prove satisfactory, according to Maritime Commission engineers. In the past 20 years, however, such progress has been made in the art of handling concrete that it is now possible to build hulls of concrete which are much lighter in weight. These hulls will give satisfactory ocean-going service, it is claimed.

The barges are 365 feet long and each carries quarters for a crew of six men. The shape of the ships is designed to reduce resistance to a minimum, though there are no propellers. Tugs will do all the pulling. Light weight is combined with strength in these craft by the use of special materials in the concrete. Hulls are about six inches thick and are poured by a special process worked out by engineers of the Barrett & Hilp Company.

Construction methods used in building the barges are somewhat unique. They are not built on ways and launched in the manner that ships usually are. Instead, each basin is excavated to a depth well below the water of San Francisco Bay and closed off by means of huge locks or gates. When a barge is completed, gates are opened, admitting the water which floats the barge out into the bay.

It is in the preparation of the basins that the work of excavating equipment has been most important. But, in addition to that, it has been necessary to convert a mile-long strip of tide land and



• Reinforcing steel is swung into place on the hull of the first of 26 concrete barges by a Lima crane during Pearl Harbor Day ceremonies.

• Interior hull view of a concrete barge. Built to the shape of a ship, these barges are designed to be towed by large seagoing tugs.

mud flat into usable condition through dirt filling operations.

Use of the flood gate type of ways saves much time in a job where speed is essential. According to Dan Wall, project engineer on the job, one of these barges will be turned out every three weeks once all kinks are removed from the construction operations. The first ship took the water in December and has, undoubtedly, done its bit for the war effort by this time.

The contractors explain that selection of the site was determined by the availability of deep water and all the public utility requirements. In this location the new job gives employment to many workmen living within the area between San Francisco and San Jose. These mechanics were employed on the construction of homes and other structures before curtailment by wartime restrictions.

Mr. Wall, the engineer in charge of construction at the new shipyard, works under George Hogan, superintendent, and George McKeever, general superintendent for Barrett & Hilp. The results of their operations have caused the stretching of many a Peninsula commuter's neck as he passed by on his way to work in the morning to see buildings that appear to have sprung up out of the ground overnight, hills that have disappeared, and thriving industry where there was once swamp land.

Fill Operations

Fill operations began last July, and within three weeks work had started on the first building. In the interim nearly three million square feet of land had been reclaimed. Guerin Bros., sub-contractors, obtained fill material for this job by shaving off a small hillock. On what had been 70 acres of tide land, buildings were constructed. The fill ranged from six to thirteen feet, dropping to two feet in some places. Simultaneously, excavation work was carried out in the basins, and dredging operations were started in the bay.

For the dirt moving work involved in filling and reclaiming the tide land, the following equipment was used: three shovels, two draglines, several cranes, a small fleet of trucks, six bulldozers, two scrapers and two small rigs for pile driving and miscellaneous work.

The yard plan is laid out in such a way that a constant stream of raw materials is kept flowing along what is basically an assembly line to the six outfitting docks.

De Velbiss Company which tackled the job of excavating the basins, has met and solved difficult problems of its own. About 27,000 to 30,000 cubic yards had to be removed from each of the six basins or pits where the hulls were to be poured.

"In each of the pits we faced the problem of removing 30,000 cubic yards of earth which was a mixture that varied from marsh mud to blue rock in a 400-foot area," H. M. Miller, superintendent, says:

"Two Northwest Model 80 shovels equipped with 2½-yard buckets and two other Northwest draglines, one with a 1¼-yard bucket and the other with a 2-yard bucket, were the main factors upon which we relied."

This earth moving project was one where speed was absolutely urgent. The schedule called for completion of the basins within eight weeks in order for ship construction to get under way as soon as possible.

"The next most important factor," says Superintendent Miller, "was, of course, the blasting. At least one-half of every pit required blasting with about 8,000 pounds of powder being used per pit."

Not to be overlooked in the equipment line-up that handled

(Continued on page 157)

NOT in the *Contract*

An English gentleman, lately arrived in China, sent for his native cook to congratulate him upon an exceptionally tasty dinner.

"I hope, Kong Ho, that you did not kill one of those dogs to provide the soup," he laughingly remarked, referring to China's pariah dogs.

Kong Ho made a solemn gesture of dissent.

"Me no kill dog, master," he declared, "Him all dead when I pick him up."

"My son says he doesn't want to get married."

"Yeah! Just wait until the wrong girl comes along."

Wifey (watching a pile driver at work): "Dear, I feel so sorry for those poor men. They have been trying for the last half-hour to lift that thing out, and every time they get it almost to the top, it falls back again."

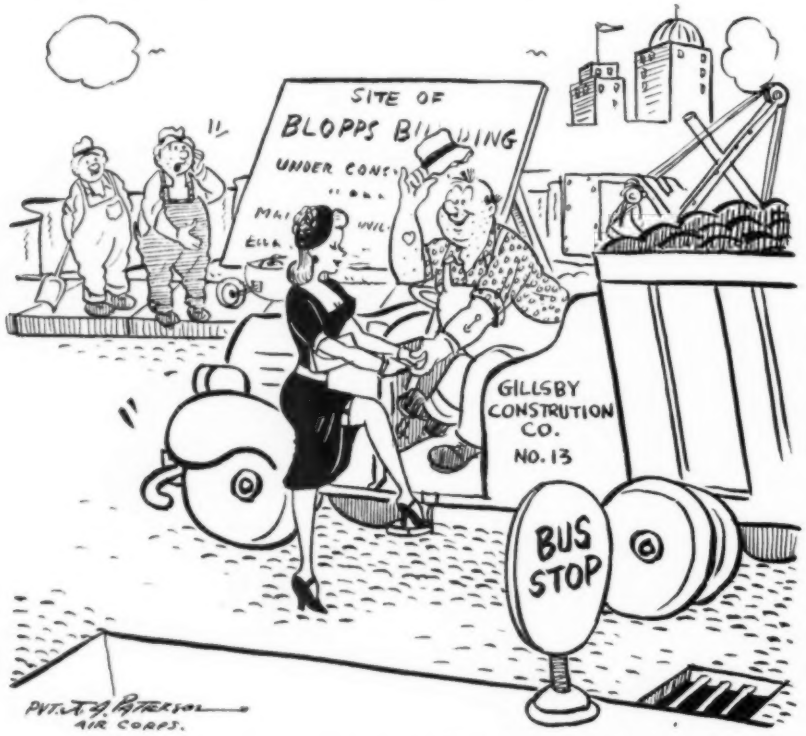
Gather ye rosebuds while ye may,
For Time brings only sorrow.
Girls you might have kissed today
May wear gas masks tomorrow.

The man had been watching the London demolition squad for days without speaking. He was now the only spectator still interested. The squad foreman's curiosity was aroused. "Say, 'aven't you got anythin' better to do than watch us work?"

"Well, chum," said the man, removing his pipe from his mouth, "this is me old home. I'm kind of interested like."

"Lumme!" exclaimed the foreman. "Pack up, you blokes! This 'ere's the blighter we bin diggin' for."

Our idea of a soft job is that of the private detective who was hired to trail a hula dancer and instructed to watch every move she made.



"Mulrooney gets by with murder, with that 'share a ride' line of his!"

This Modern Age

Photographs had been taken at the war wedding, and the happy pair were assured that proofs would be sent to them so that the best might be chosen for delivery.

Some days passed, and the looked-for envelope arrived.

All agog, the young couple opened the envelope. But instead of pictures of the bridal group they were confronted with studies of a two-months-old baby.

The bride nearly collapsed and so did the bridegroom, when, on looking at the back of one of the proofs, he read: "Please state clearly when ordering which size you want, and how many."

An old lady, who was about to die, told her niece to bury her in her black silk dress, but to cut the back out and make herself a dress.

"Oh, Aunt Mary," said the niece, "I don't want to do that. When you and Uncle Charlie walk up the golden stairs, I don't want people to see you without any back in your dress."

To which the old lady replied: "They won't be looking at me. I buried your Uncle Charlie without his pants."

He was dug out of his wrecked car and carried to a doctor's office.

"I can't do anything for him," said the doctor, "I'm a veterinary surgeon."

"That's all right," replied the patient. "I was a jackass to think I could do 50 on those tires."

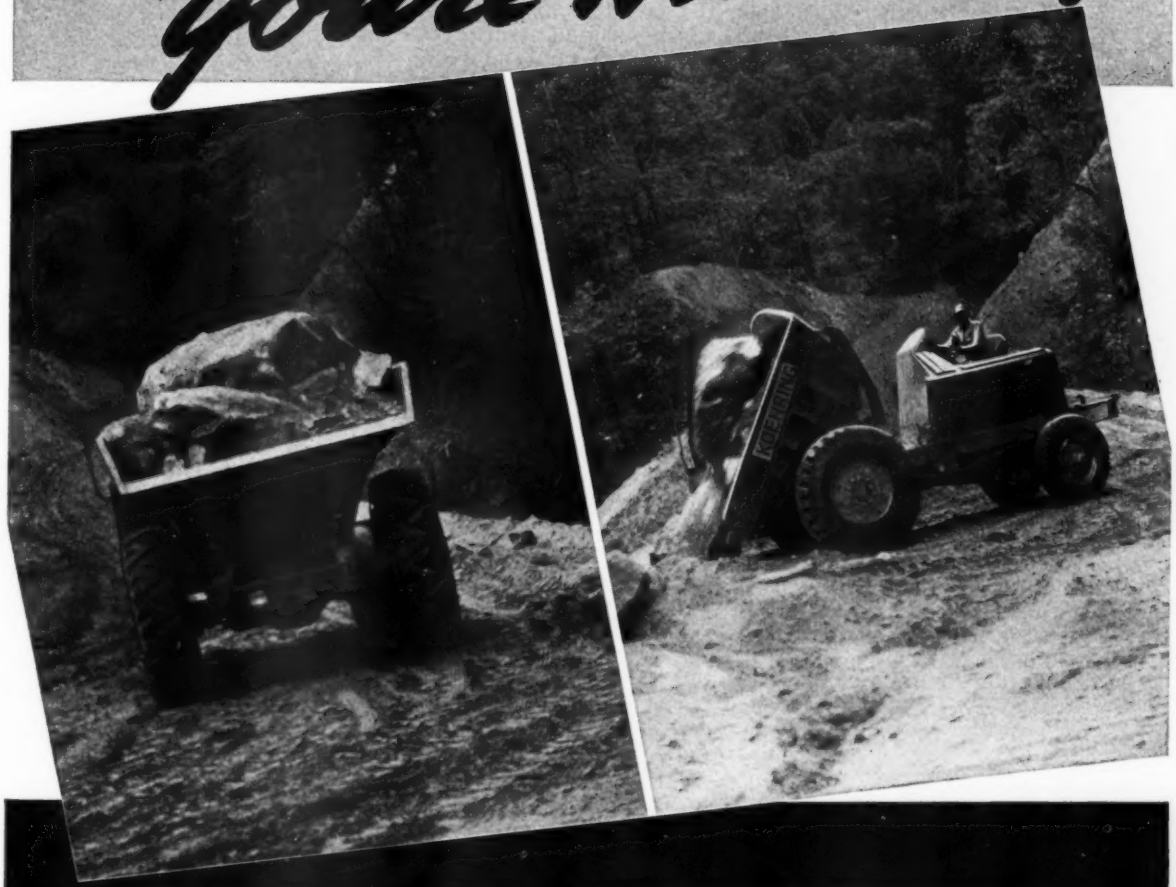
An English doctor's daughter was met one day by her aunt, who asked her why she was not at school.

"We are not going to school this week," she said. "There's an expectant bomb in our hockey field."

A comely colored girl had just been baptized in the river. As she came to the surface she cried, "Bless de Lawd: I'se saved! Las' night I was in de ahms of Satan, but tonight Ah'm in de ahms of de Lawd!"

"Sistah," came a baritone voice from the shore, "how is you all fix' up for tomorrow ebening?"

If it's Rock you're Hauling



KOEHRING DUMPTORS ARE YOUR BEST BET

Here is good pictorial proof that Koehring Dumptors can haul and dump rock of any reasonable size and come speeding back for more. Wide body opening means easy loading, and gravity dumping is instantaneous. The massive chassis easily withstands the shock of constant heavy duty service. Koehring Dumptors will save you valuable time too, with three speeds in either direction, quick load spotting and dumping up to the edge of the fill. Haul rock faster with a Koehring Dumptor.

Your Koehring Dumptor will last much longer with proper lubrication and care . . . depend on your Koehring equipment distributor and use genuine Koehring parts.

KOEHRING COMPANY • *Milwaukee, Wis.*

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

Field NOTES

Meet Old Man Quantum Meruit

When circumstances are such that it is unjust to pin a contractor down to the strict letter of his contract, an "out" is sometimes found through a rule of law that has two Latin words as its label — "quantum meruit." In plain English "quantum meruit" means "as much as he deserved." Translated in American law, the term tags the rule under which a person is entitled to reasonable pay for work not covered by contract. The rule may apply to a case where there never was an agreement between the parties as to the amount to be paid, or it may apply to a case where there was a contract but one that ought to be deemed to have been abandoned.

A decision lately rendered by Judge St. Sure of the United States District Court for the Northern District of California makes an interesting and important application of the quantum meruit rule.

A contract to enlarge a dam for the city and county of San Francisco contemplated approximately 30,000 yards of rock to form a foundation. But when the job was finished, after more and more rock had been ordered shot down from canyon walls, about 84,000 yards had been excavated. In the meantime, the contractor's work had been seriously damaged through delays caused by the city's engineers.

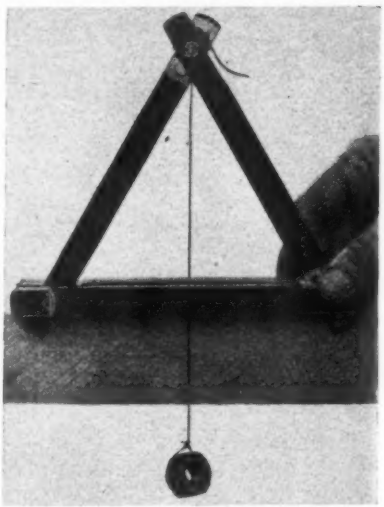
When the contracting company sued the city for damages, the court dismissed that item of the company's claim on the ground that the claim had not been presented to the defendant's controller within sixty days after the job was finished, as required by the San Francisco charter.

But although the court decided that the contractor had lost the right to collect damages on the ground of breach of the contract by the city, that did not prevent the court from disregarding the contract and permitting the contractor to collect under the quantum meruit rule the reasonable value of the work done. After summarizing the main facts of the case, Judge St. Sure said:

"Circumtances unanticipated by the parties made radical changes in the character and amount of the work to be performed under the contract, greatly increasing the expense thereof. I think the contract may be deemed abrogated and plaintiff should be permitted to recover on a quantum meruit basis."

But Judge St. Sure's opinion in this case points out that the mere fact that a contract may prove to be more difficult to perform than was expected by the contractor will not relieve him from finishing the job for the pay fixed in his contract. But it is also pointed out that if unforeseen circumstances make performance of the contract vitally different from what both parties contemplated, Justice will step in and apply the quantum meruit rule. — *Arthur L. H. Street, Attorney*

• To facilitate sand unloading operations at the batching plant, Edward Selander, Fort Morgan, Colorado, contractor, simply laid a ramp of planks to the top of a sand pile and backed his trucks up the 35 degree grade to dump directly into the batcher.



• Whenever you're in need of an emergency level, an ordinary folding rule and a weighted piece of string can be rigged in this manner to serve as a fairly accurate tool.

Folding Rule Level

In an emergency, the folding rule can be used as a fairly accurate level device. Raise two of the sections or joints of the rule to form a triangle with the remainder of the parts. Drop a small cord through the opening to which any odd piece or weight can be attached. The upper end of the cord is run through the joint grommet hole. The sections of such rules are quite closely spaced where the joints unfold. The base is laid on the piece to be tried. When th ecord is in line with the center mark or division of the strip below, the piece or object being tried will be level. This will not of course be as close and as accurate as a regular level, but in an emergency where extreme closeness is not a requisite, it will be very satisfactory for many purposes where a part must be levelled up for temporary use. — *Frank Bentley*

Army Camp Roads

A typical 30,000-man camp requires about 18 miles of primary, 7 miles of secondary and three miles of third class roads, exclusive of surfaced parking centers for the cantonment area.

HOW TO DRILL *FASTER*

YOU CAN REMOVE LESS ROCK YET BOTTOM THE HOLE AT THE DESIRED SIZE BY *using* JACKBITS

All plants of Ingersoll-Rand Company are flying the Army-Navy "E" awarded "for high achievement in the production of war materials."

Experience has shown that the user of Jackbits can frequently use bits of smaller gauge and still bottom the desired size hole. On many jobs we recommend only 1/16" gauge changes instead of the usual 1/8". The benefits of this practice are: Faster drilling speed; reduced strain on drill steel; and lower rock drill upkeep. For example, on one very large job the drilling speed increased 37% when Jackbits were put to work.

JACKBITS HOLD THEIR GAUGE

Jackbits are made of hard, wear-resistant steel, scientifically heat-treated and hardened in automatic furnaces and quenching devices. These advanced methods of manufacture coupled with the Jackbit design, backed by more than 70 years of rock drill experience are responsible for this modern bit which holds its gauge longer and permits holes to be collared smaller. In addition, there is such a wide range of designs and sizes of Jackbits that precisely the right bit can be selected for each job. When Jackbits are reconditioned with Ingersoll-Rand equipment the original accuracy of the manufactured bit is maintained.

15-224

SOLVE YOUR DRILLING PROBLEMS WITH IR JACKBITS

This sketch shows why Jackbits increase drilling speed. The shaded area is the rock that does not have to be drilled when the changes are 1/16" instead of 1/4".

Ingersoll-Rand

11 BROADWAY, NEW YORK, N.Y.

Shots from the FIRING LINE

J. W. Robinson Heads House Roads Committee

Congressman J. W. Robinson of Utah has been named chairman of the House Roads Committee. A member of this committee since 1933, he succeeds former Oklahoma Representative Wilburn Cartwright.

The new chairman is well-known to members of the highway industry because of his frequent appearances at conventions and meetings of the American Road Builders' Association.

Commenting upon this new assignment, ARBA Engineer-Director Charles M. Upham declared, "Congressman Robinson is one of the nation's foremost authorities on roads and road building. He has a genuine interest in road problems in all sections of the country and has made a thorough study of laws and regulations affecting highways, roads and trails of all types. During his 10 years on the House Roads Committe he has helped to draft and pass a great deal of legislation that has been of significant benefit to the national highway system."

Curtail Construction Work

Construction projects having a total cost of $3,436,319 were stopped during the week ended February 5 in line with the policy of curtailing non-war work, according to the War Production Board.

During the same period, revocation orders previously issued halting two highway projects costing a total of $660,000, were canceled and authorization was given for work to continue.

Of the total cost of the projects stopped by WPB, $2,198,319 involved highway and bridge construction.

This figure brings to $1,274,165,628 the total cost of all projects which have been stopped either by WPB or the programming agency since October 23, 1942, when the facility review committee was established to examine the relationship of construction work to the war effort.

The total cost of the projects which were stopped during the period January 30 to February 5, 1943, inclusive, follows:

Highways and bridges	$2,198,319
Church	5,000
Army civil works	1,233,000
Total	$3,436,319*

*Does not include one power project for which cost was not given.

Traffic Off 48 Per Cent

Traffic on rural roads was off 48 per cent in the newly-rationed area and 49 per cent in the eastern rationed area in December compared with the same month a year ago, according to counts of more than 500 "electric eye" recorders, announced by Public Roads Administration of Federal Works Agency. The counts were reported by 43 state highway departments.

Traffic on 58 toll facilities in the newly-rationed area decreased 35 per cent in December and 9 per cent in November, compared with the corresponding months a year earlier. The December decrease on 22 toll facilities from Maine to Florida was 19 per cent. The decrease in passenger cars in December on the Pennsylvania Turnpike and on Fleetwood Viaduct, Westchester County, New York, was more than 70 per cent. Truck and bus traffic on the Turnpike was decreased only 9 per cent.

In view of these and other factors adversely affecting motor vehicle use the report states, " * * * we are unable to see any favorable element in the outlook for 1943 motor vehicle revenue. All influences are in the negative direction, and we can see nothing tangible which would serve to halt the steadily downward trend during the year."

Stimulated Mining Operations Indicated by Report

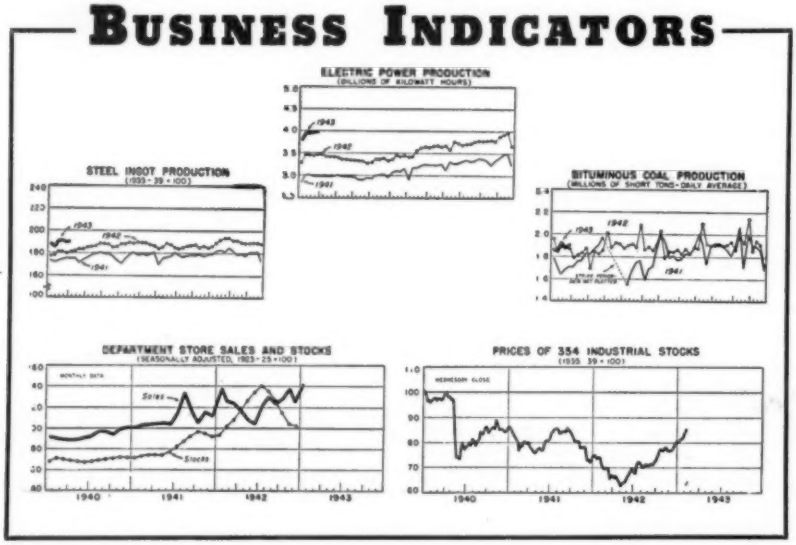
United States steel production in 1943 will approach twice the combined output of the Axis nations. Back of this stepped-up steel production will be greatly stimulated mining operations, as 123,931,000 tons of iron ore, 27,432,000 tons of limestone and 88,173,000 tons of coal will be required to produce the estimated 97,000,000 tons of steel.

These facts give added significance to the report from the U. S. Bureau of Mines covering the first year of its intensified war program. It reports continued gains during the past 12 months in its two-fold assignment of conserving manpower, equipment and the nation's mineral wealth while speeding up the production of materials essential to victory—coal, metals, minerals, helium and petroleum. It has perfected metallurgical processes which are now being used to tap reserves of low-grade ores, more than doubled the output of helium, charted millions of tons of critical, essential and strategic ores and launched programs to make secure the uninterrupted output of mines, smelters, quarries, coke ovens and other facilities of the mineral industries.

Outstanding among its achievements was the exploration work which increased by more than 32,000,000 tons the estimated reserves of chromite, manganese, mercury, iron ore, tungsten, nickel, bauxite and high alumina clay —the raw materials for tanks, planes, ships, guns and other weapons of modern warfare. As these mining operations increased in volume and scope, the mine-to-market roads on which this multi-billion-dollar industry depends for the swift flow of its products also gained new importance.

Five months ago the bureau reorganized and streamlined its operating structure, placing still greater emphasis on exploratory work, metallurgical research and other special laboratory projects inaugurated for the war. As a result, 95 separate war minerals projects involving exploration and metallurgical testing have been launched in 25 states and Alaska for 31 different minerals. These projects are co-ordinated with the bureau's vast system of experiment stations, pilot plants and laboratories. In the past year estimated reserves of iron ore have been increased

BUSINESS INDICATORS



by approximately 15,000,000 tons; those of chromite by 2,000,000 tons; those of low-grade nickel, 6,000,000, and those of bauxite and high-alumina clay for aluminum, nearly 8,000,000 tons. Since 1939, when the bureau embarked on its search for war minerals, the estimated reserves of commercial or near-commercial grade ores have been increased by more than 56,000,000 tons.

Mineral products vital to the war effort include magnesium, aluminum, manganese, chromium, cobalt, vanadium, lithium chloride, lead, zinc, antimony, cadmium, titanium, nickel, beryllium, tantalum, bismuth, platinum, tungsten, molybdenum, tin, strontium, copper, mercury, fluorspar, graphite, iron and talc. Metallurgists and chemists have worked throughout the year on the job of finding new methods of recovering these war materials from complex minerals and improving existing processes so that every ounce of metal can be recovered.

Augmenting the many mechanical improvements and chemical processes is the system of roads that nearly every mining area now has. The improvement of these roads has made it possible for mines that otherwise would be unable to stand the prohibitive cost of old-fashioned transportation to haul their ores to mills and reduction plants at costs that are comparatively economical.

The advent of good roads and the heavy-duty truck has reduced the cost of transportation of ores to milling plants to such a degree that many properties which were formerly unable to have their ore treated are now within reach of economical production. Ores that once cost, by the old team and freight wagon, $5 to $10 a ton and sometimes more for haulage are now being delivered over greater distances much faster and at a fraction of the cost of two or three decades ago.

Credit for this improvement, which is now important to war production and will continue to benefit the mine owners after the war, belongs to the cooperation of the state and county highway departments, which recognized the benefits of this road construction, plus the perfection of road-building equipment which permits the making of these roads at nominal cost into heretofore inaccessible areas. The mining industry, especially that portion of it which comprises the small developing properties, is as certainly dependent on the lowered costs of transportation as it is upon the more economical methods of ore treatment.

North Atlantic Convention

Several talks pertinent to the excavating industry were given on the three-day program at the nineteenth annual meeting of the Association of Highway Officials of the North Atlantic States at the Hotel Pennsylvania in New York City last month.

Dwight W. Winkelman, member of the advisory board of the Associated General Contractors of America, Inc., talked on: "The Contractors' Part in the Wartime Maintenance and Repair of Roads and in the Post-war Program." The speech of R. C. Georger, director of wartime transportation of the New York State Department of Public Works, was entitled, "Providing Wartime Transportation."

Other talks of especial interest on the program were: "Aerial Surveys for Highway Location," by William J. Meyer, vice-president of the Aero Service Corporation, New York City, and, "The Relation of the Airways to the Highways," by Gill Robb Wilson, director of aviation, New Jersey.

Thomas H. MacDonald, U. S. Commissioner of Public Roads, spoke on, "The Conduct of the State Highway Departments for the Duration of the War."

Fear Road Income Loss

North Carolina state highway planning authorities expect a 1943 reduction in gasoline tax and motor vehicle registration fees of about 50 to 59 per cent of the 1941 calendar year revenue. The tire shortage and gasoline rationing last year brought a reduction of 21 per cent in gasoline revenue and six per cent in motor vehicle registration fees below the all-time high year of 1941 in the "Tar Heel" state.

Fearing no substantial relief from the tire shortage until early in 1944 the North Carolina report stated:

"The tire shortage has been, and remains, the major basic long time control factor. It had been hoped and planned that synthetic rubber plants—the only ultimate solution—might begin to produce in important amounts by next July (1943). It is now reported that the program is 2-3 months behind schedule. However, this output is preempted for our armed forces, our allies, and for war production, for many months thereafter."

Another factor which the North Carolina authorities expect will materially decrease motor vehicle registrations this year is mortality and depreciation of vehicles.

• A military road on the Indian frontier near the Afghanistan border receives the attention of a LeTourneau bulldozer and rooter powered by a Caterpillar tractor.

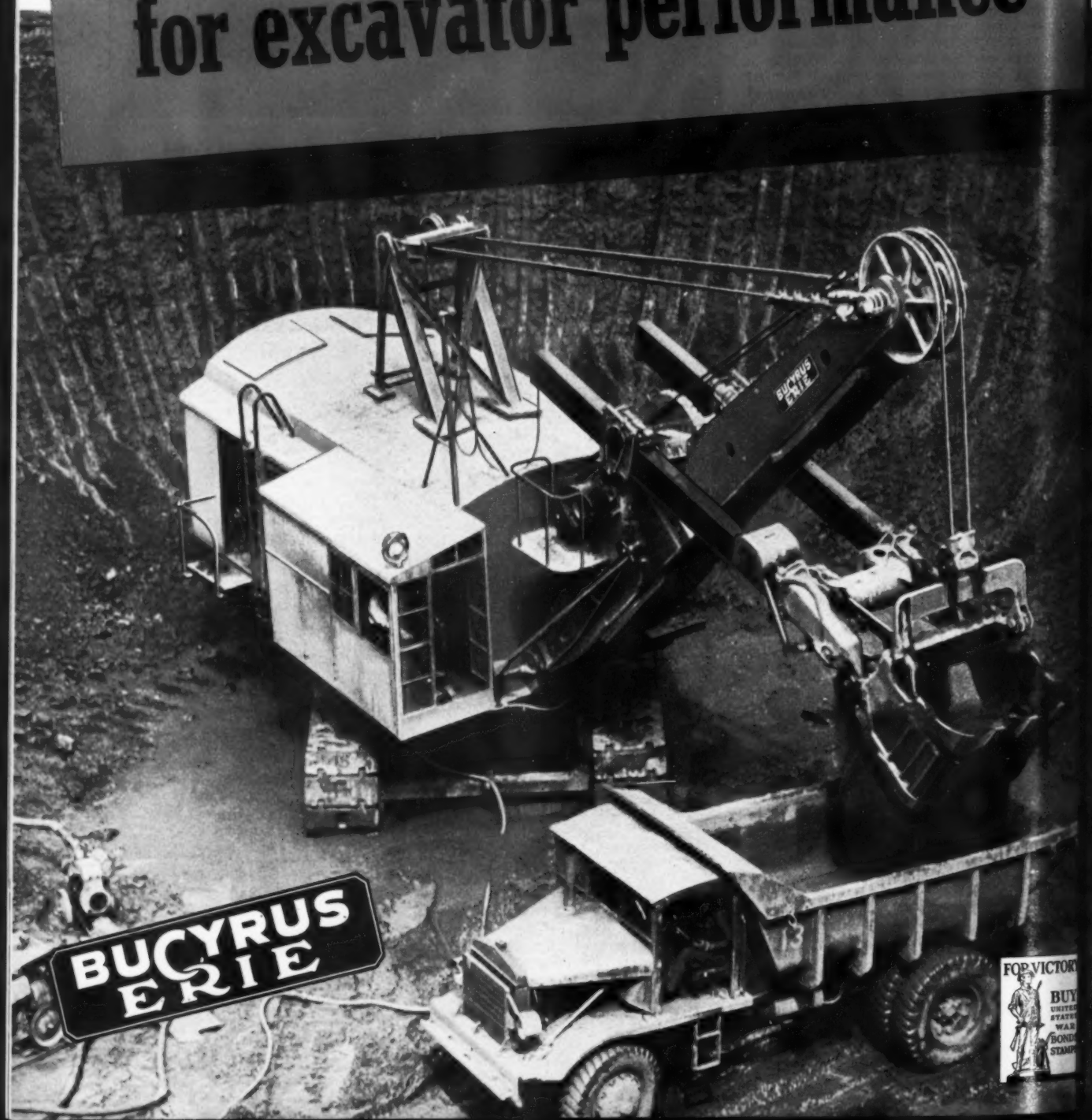
WPB Makes Further Bureau of Reclamation Changes

Further changes by the War Production Board in its order of October 30 directing that construction be halted on all but five of the Bureau of Reclamation's power, irrigation, and municipal water projects in the West have been announced by Secretary of the Interior Harold L. Ickes.

Construction under certain specified limitations may proceed on eight projects. These embrace irrigation facilities for war relocation centers for Japanese evacuees from the Pacific Coast on three projects: Klamath, Oregon-California; Minidoka, Idaho; and Shoshone (Heart Mountain Division), Wyoming. Two projects—Altus, Oklahoma, and Provo River, Utah—will be continued to the extent necessary to provide water for municipal, military or war industrial purposes. The Gila Project in Arizona is to proceed for the development of guayule rubber. The completion of a housing project of 140 family units at Boulder City, Nevada, is also permitted. The Mancos Project in Colorado may continue to the extent necessary to provide work for a conscientious objector group. (Work on the Altus Project can proceed only if adequate additional funds are provided, the Bureau of Reclamation explained.)

On the ninth project, the Colorado-Big Thompson in Colorado, work is to cease because of the WPB action immediately on all features except on Green Mountain Dam and power plant,

3 Reasons the 85-B meets WARTIME STANDARDS for excavator performance



1 SUSTAINED HIGH OUTPUT

Three main factors contribute to the 85-B's high production performance: the scientific balancing of speeds, torque and weight placement for high-speed digging; the application of a larger proportion of hoist motor power to the dipper teeth for efficient digging; and ample power under perfect control for easily maintaining a fast operating cycle.

2 MINIMUM MAINTENANCE REQUIREMENTS

The 85-B's design and proper balance provides smooth operation, reduces stresses on the machine and keeps maintenance requirements at a minimum. Excess weight has been stripped from this modern excavator, yet there is rugged strength in every part to provide long operating life with less lost time and upkeep cost. The 85-B gives you low power consumption per cubic yard.

3 MAXIMUM UTILITY

The 85-B moves fast, around the pit or up steep inclines. With its combined digging and moving speeds, it is well adapted to handling both stripping and loading. Where shovel work may be only part of the job, the 85-B is easily converted in the field to dragline or crane. Equipped for service as a heavy-duty quarry and mine shovel, or as a standard type coal loader, the 85-B has an approximate working weight of 117 tons. Equipped as a horizontal-thrust coal loader the 85-B working weight is about 5,000 lbs. less.

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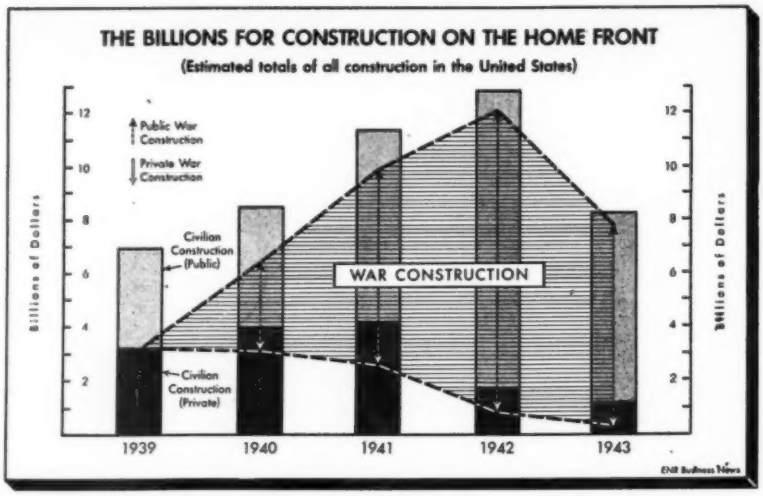
the completion of which has been authorized.

The information on which the announcement was based was contained in two letters to Secretary Ickes from Ferdinand Eberstadt, WPB, vice chairman, who advised of the action of the WPB Facility Review Committee. The committee had reviewed requests of the Department of the Interior, and the Bureau of Reclamation for reconsideration of an order of October 20 which would have had the effect of stopping construction on all reclamation projects except five involving power installations. On November 16, Chairman Eberstadt advised the secretary that the facility review committee had concluded that work would be permitted to continue under existing priority ratings on ten additional projects; that certain specified construction would be permitted to proceed on nine other projects and that work would be stopped on fourteen others. Action was then deferred on the eight projects which are now covered by Eberstadt's letter of November 30. The Mancos Project was one on which work was ordered to cease.



• Estimated totals of all construction in the United States from 1939 to 1943 are presented in this "Engineering News-Record" chart.

600-Mile Road Aids Defense of Australia

Australia's defense against Japanese invasion has been greatly strengthened by the building of 600 miles of all-weather road through the center of the Northern Territory from Alice Springs to Larrimah. The highway soon is to be extended to Darwin traversing a total distance of 1,000 miles.

Prior to the opening of this road the only land link with supply and reinforcement bases across Australia was a vulnerable railroad which might be put out of action for a time with one bomb. The bombing fear has been greatly lessened since even the heaviest raid could not halt traffic over the road for any length of time.

The link from Alice Springs to Larrimah was constructed in the record time of 87 days with an initial cost of $1,573,000.

Facilities for vehicle maintenance and meals for convoy personnel and other troops are provided at "staging camps" along the highway. Each camp has a work shop and services up to 200 military convoy vehicles each week, doing a wide range of repairs.

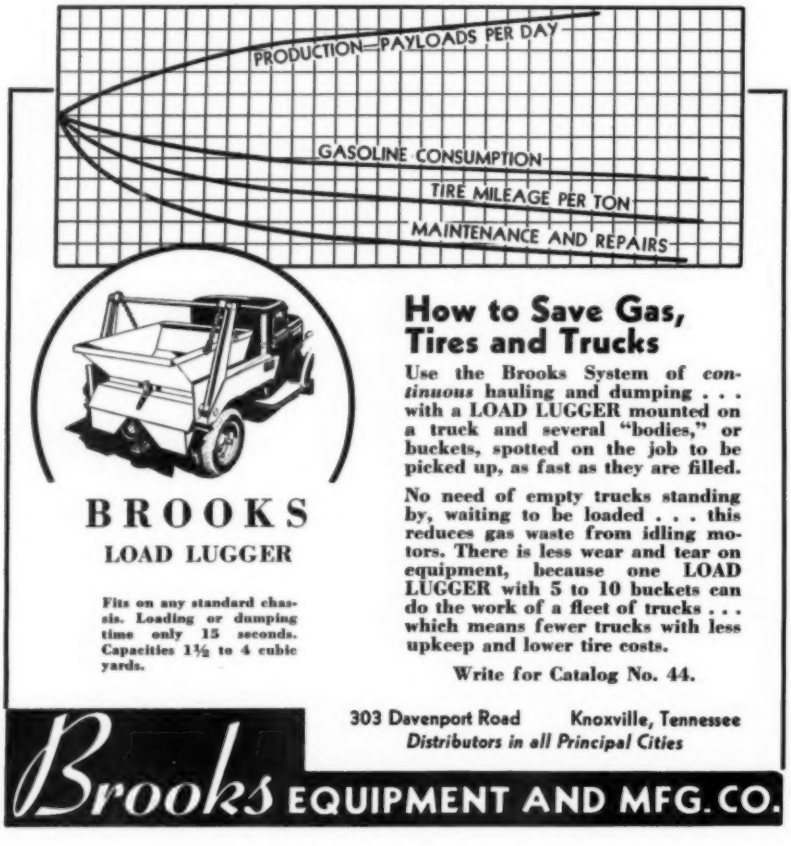
Convoys on the completed link of the North-South road now are traveling three million miles per month. After the war it is expected that the highway will be of great value in exploitation and settlement of Australia's Northern Territory.

ARBA President Assigned Alaskan Post

Major Chris J. Sherlock, American Road Builders' Association president, is now chief operations officer for the Skagway, Alaska, district of the U. S. Army Engineer Corps. He was formerly stationed at Denver, Colo., where he was assigned as operations officer immediately after receiving his commission last June.

The first southerner to head the international highway organization, Major Sherlock was, until his resignation a year ago, state highway director of Alabama. He had been associated with the state highway department since 1922 and was named director in 1939. He was installed as ARBA president at the association's annual convention in Memphis, Tenn., in March, 1942.

While an undergraduate at the Georgia Institute of Technology, he was a member of the Reserve Officers Training Corps in 1918. He served the Alabama highway department in several capacities before assuming the directorship. A recognized expert in high-



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way and bridge engineering, he has also served as vice-president of the American Association of State Highway Officials.

Moreell and Barnes Receive Moles Award

Rear Admiral Ben Moreell (CEC) USN, chief of the Bureau of Yards and Docks, U. S. Navy, and Frank W. Barnes, assistant general manager of Merritt-Chapman & Scott Corp. were given the Moles award at a dinner in New York on February 3, 1943. This award is made annually in recognition of outstanding achievement in the heavy construction field. Recipients this year were selected by a committee headed by Arthur A. Johnson, contractor, of Long Island City, N. Y.

The award to Admiral Moreell is in recognition of his work in direction of naval expansion, involving by far the greatest amount of construction ever undertaken by the Bureau of Yards and Docks.

Admiral Moreell came to the Navy as a civilian, graduated from Washington University, St. Louis, Mo. in 1913 in civil engineering, following which he spent four years as designing and resident engineer on construction in the same city. As a result of a competitive examination he was appointed to the U. S. N., the first assignment being that of assistant to the Public Works Officer at the New York Navy Yard in 1917. In 1918 and 1919 he was with the Azores Detachment of the Atlantic Fleet and in 1920 returned to work in Massachusetts.

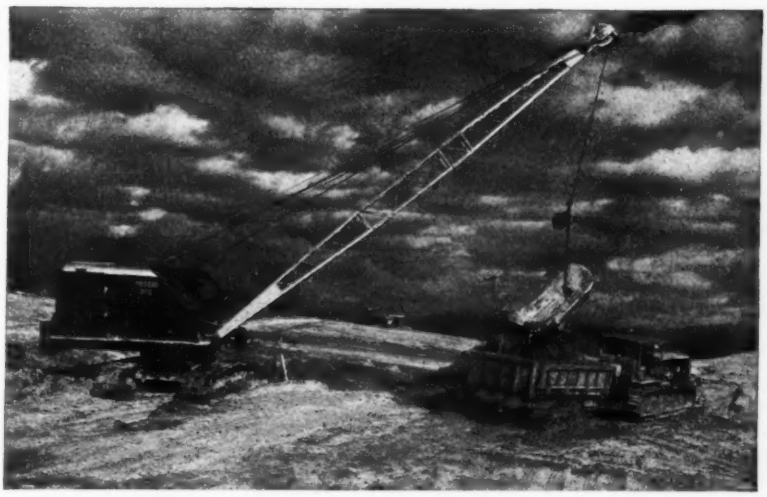
Next came four years as executive officer to the engineer in chief of the Department of Public Works in Haiti, followed by two years at the Norfolk Navy Yard. In 1926 he was detailed an assistant design manager of the Bureau of Yards and Docks, and while there wrote a comprehensive treatise on concrete design that had been favorably received throughout the engineering profession. In 1930 Admiral Moreel became public works officer of the Puget Sound Navy Yard and Thirteenth Naval District where he handled a large emergency construction program, receiving the commendation of the Navy Department for the outstanding work.

Admiral Moreell spent a year in Paris studying European engineering design and construction practice and in 1933 returned to the U. S. to supervise the design of a ship model testing basin at Carderock, Md. In 1935 he became project manager of the Shipbuilding and Repair Facilities and in 1937 was assigned as Public Works Officer in Hawaii.

Late in 1937 Moreell (then Commander) assumed duties as chief of the Bureau of Yards and Docks and chief of civil engineers of the U. S. Navy with the rank of Rear Admiral. As head of the Bureau he has increased the yard and dock facilities tremendously with construction including several large dry docks using advanced methods of underwater concrete placing.

In 1924 Moreell was awarded the Medal of Honor and Merit, Republic of Haiti and holds the Wason Medal of the American Concrete Institute for his research work on articulations for concrete structures. He is a member of Sigma Xi, honorary scientific fraternity, and Tau Beta Pi, honorary engineering fraternity. He is past president of the American Concrete Institute; past president of the Society of American Military Engineers; member of the American Society of Civil Engineers; and the Society of Naval Architects and Marine Engineers. During the past year Rear Admiral Moreell received the honorary degree of Doctor of Engineering from Washington University and has recently been elected to honorary membership in the American Society of Civil Engineers.

Topping a long career in construction of railroad, hydro-electric, tunnel and other work in this country and abroad, Frank Barnes is now in charge of construction of an off-shore base and projects in New England for the combined firm of George A. Fuller Co. and Merritt-Chapman & Scott Corp., the organization which built Quonset Point Naval Air Station in eleven months' time. Mr. Barnes has risen to his high position in the heavy construction-engineering field without benefit of a formal college



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education. Raised in Massachusetts, he started work in the engineering department of the Central New England & Boston & Maine Railroad after graduating from high school, serving successively as a rodman, a transitman and chief of party. Studying engineering books while he worked, he combined his technical education with practical experience, to obtain an education comparable to that which he would have secured in the best technical schools.

In 1910 Mr. Barnes started work in the heavy construction field where he has been actively and continuously engaged up to the present time. For fifteen years he was construction superintendent for the J. G. White Engineering Corp. of New York City supervising many of the firm's large projects, including massive hydro-electric developments, street railway systems, industrial buildings and irrigation plants.

Becoming associated with the engineering firm of Parsons, Klapp, Brinckerhoff & Douglas of New York in 1922, Mr. Barnes soon became vice president of the Parklap Construction Corporation, a subsidiary, a position he held until 1937. Under his direct supervision this firm built the Detroit and Canada tunnel for vehicular traffic involving the unusual trench and tremie method of construction, shield work and the box subway type of underground tunnel work.

Probably the most outstanding of the construction jobs supervised and completed by Mr. Barnes during his association with Parklap was in Belgium where two parallel tunnels were built under the Scheldt River at Antwerp—one a two-lane tube for vehicular traffic and the other a tunnel for the use of pedestrians. The terrain encountered was of soft ground, quicksand and clay, requiring unusual methods of construction, including artificial freezing of the soil surrounding the ventilating shafts. In recognition of his services for the Kingdom of Belgium, Mr. Barnes was made an Officer of the Order of the Crown of Belgium.

Mr. Barnes became associated with Merritt-Chapman & Scott Corp. in 1937 as construction manager. Tailor-made cofferdams for bridge piers at Deer Island, Maine and unusual foundation work for the Potomac River Bridge at Washington, D. C. are among the outstanding projects supervised for this firm.

When what was then defense work started, Mr. Barnes went to Quonset Point, R. I. to take charge of the construction outlying bases and later was assigned to supervision of work at a Naval Advance Base Depot on the mainland. The building of the outlying bases was unique in that it was accomplished by remote control with Mr. Barnes supplying all needs and handling the work from a central control position at Quonset.

Mr. Barnes is a member of the American Society of Civil Engineers and the American Society of Military Engineers, the Moles, Cherry Valley Country Club, Whitehall Club and the Roamers. He is a registered engineer in the States of New York and Connecticut.

Aviation Division Proposed for Alabama Roads Department

By Bethune Jones

Establishment of an aviation division in the Alabama State Highway Department is being considered by Governor Chauncey Sparks, it was revealed last month as the governor announced he had suggested a special study of transportation problems preparatory to the convening May 4 of the Alabama legislature.

In asking an interim legislative agricultural committee to study transportation problems with the view of expediting farm products to market, the governor also suggested consideration be given the possibility that aviation will "revolutionize" transportation after the war.

Governor Sparks said he believed airplanes would revolutionize transportation in the future, enabling farmers to deliver fresh produce at distant points overnight.

"I have in mind," he declared, "the establishment of a division of aviation in the Highway Department. Air transportation is coming, and plans must be made for our cities and towns to have airports when it does come."

Concerning the highway construction outlook, the governor said state highway department officials had estimated that revenues from gasoline tax and motor vehicle licenses would decrease 40 per cent this year, leaving little hope for new construction, except for military access roads financed entirely by the federal government and for about $3,000,000 worth of work for which commitments already have been made.

He asked an interim committee on highways to study some plan by which the state could work with counties,

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already hard pressed for machinery and labor, to maintain their roads while the state is maintaining its approximately 6,000-mile system.

Construction Industry Will Stabilize Post-War Period

Stabilization of employment will be a major responsibility of the construction industry in the post-war adjustment period, according to Dan W. Kimball, president, Associated General Contractors of America.

In a radio discussion broadcast to the nation by the Mutual network, President Kimball told Leverett Lyon, chief executive officer, Chicago Association of Commerce, that prospects for employment in the construction industry will be exceptionally good after the war.

Pointing out that construction employs more men than any other industry, the building authority said:

"Men can be more quickly re-employed by the construction industry than by any other, because of a high degree of mobility, freedom from need of re-tooling, and the opportunity for employment of a large proportion of untrained or semi-skilled workmen."

The construction industry believes that the nation has a great future, Mr. Kimball said, adding that he foresaw the following post-war building needs:

One million new homes a year for many years after the war.

Rebuilding of poorly planned cities and run-down urban areas.

Large scale projects to improve whole sections of the nation by providing irrigation, flood control and development of water power.

Expansion of the entire American transportation system—highways, railways, waterways and airways.

New building for new industries born of wartime technological advancement.

The greatest market for post-war housing will lie in the moderate-cost, urban home, built to sell at $2,500 to $3,500, Mr. Kimball predicted. On the basis of a 110-billion dollar national income, homebuilding will represent 7 per cent of America's total economic activity.

"Obsolescence, due to wartime invention and development of new products greatly stimulate the need for new industrial, commercial and institutional construction," he said.

Forecasting improved "factory production-line methods" in the building industry, he said:

"The industrial pattern of future housing construction will be, first, simplification and standardization of the materials used; second, simplification and mechanization of the processes of assembly, and third, attainment of volume production."

The path for new developments has been opened by the pressure of wartime necessity, said Mr. Kimball, explaining that new materials for all types of construction are today having their first genuine opportunity.

"Overly stringent building codes are now being revised; realty taxation is being moderated; blighted areas are now available as cheap land to be converted to new social and economic uses," he said.

Calling for more attention to post-war planning problems, Mr. Kimball said:

"Programming of a policy for public works projects, whether in housing, institutional or utility construction should have immediate action in order to meet the shock of post-war readjustments, regardless of how near or far removed may be the date of victory."

• English "Tommies" fill in and level off a bomb crater at an air field in western England with a LaPlant-Choate bulldozer mounted on a Caterpillar tractor.

Army Engineers Search For Experienced Men

Critical manpower shortages in the heavy construction equipment and material field threaten a score of vital Army engineering functions, and skilled workers must be immediately recruited, for civilian jobs, to rehabilitate, operate and maintain heavy duty equipment, according to the Army Corps of Engineers.

"Experienced civilians ranging from operating engineers and master mechanics down to virtually material stock room clerks are needed to replace Army personnel who have been sent overseas," states the commanding gen-

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eral of the Corps of Army Engineers. "Much equipment used in blasting through routes for our soldiers has begun to wear and constant repairs and replacements for thousands of machines must be effected."

Base pay for the various jobs ranges up to $3,800 a year, plus per diem allowances for some. Skills needed include spare parts consultants, operating engineers, master mechanics, high grade mechanics, purchasing agents, and inspectors, who understand the operation, maintenance and repair of diesel, electric and gasoline motors; men familiar with air, electric and gasoline tools and compressors; men skilled in operating and repairing concrete mixers, cranes, graders, scrapers, shovels, tractors, electric generators, power units, and acetylene and electric arc welders; those with knowledge of the essential material and parts therefor; those who are experienced in the inspection of related engineering items and equipment; and many who understand steel mill operation and the fabrication of steel products, and the various spare parts of heavy construction, including supervision or assistant supervision of warehousing, and the clerical and administrative functions incident to the handling of heavy construction machinery spare parts.

"These not only are opportunities for experienced men, who are not either 1-A classification under the Selective Service act or subject to reclassification and early induction in the armed forces, to get steady work at good pay, but those who fill them will be performing a truly patriotic duty, since their filling is a vital necessity to the war effort," Captain Lowell H. Mills of the Field Maintenance Section of the Engineer Corps declared. "Personable, aggressive and enthusiastic men, with qualities of leadership and administrative ability will be given every opportunity to use their skills to maximum advantage."

Qualified applicants should immediately communicate with the Seventh United States Civil Service Commission, Room 1107, in the New Post Office Building, Chicago—Telephone: Wabash 9207, Extension 589.

Metals and Minerals Production Highest in U. S. History

The United States produced more metals and minerals in 1942 than at any time in its history, according to a year-end report from the Bureau of Mines.

The value of all mineral products produced in the country in 1942 soared to a record figure of more than 7½ billion dollars, exceeding by 8 per cent the peak year of 1920 when prices were abnormally high following the first World War, and topping the 1941 level by 10 per cent, according to the estimates submitted by the bureau to Secretary Ickes.

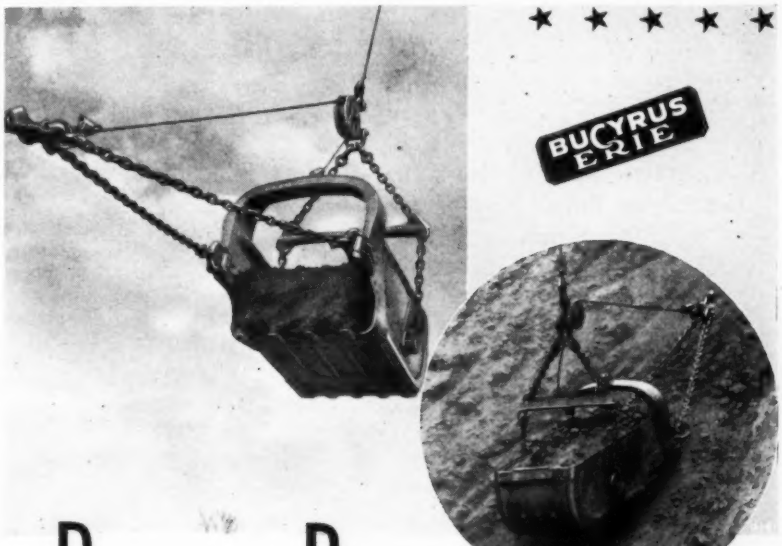
Increased demands for wartime weapons and materials, expanded domestic needs, and higher prices contributed to the 1942 record, the Bureau of Mines reported.

"All branches of mineral production shared in this achievement which is an outstanding contribution to the nation's war program by the mineral industries," Secretary Ickes said. "But despite this record our production is still insufficient for current demands and there is no justification for complacency."

With a total estimated value of $7,525,000,000, the mineral production figures were broken down to show the value of metallic products as $2,330,000,000; mineral fuels, $4,060,000,000; and other nonmetallic minerals, $1,135,000,000. Larger values are anticipated in 1943.

Nearly all of the mineral products which go into tanks, planes, guns, ships and other weapons with which to fight the Axis were turned out at unprecedented rates in 1942. Output of aluminum and magnesium, the light metals so greatly in demand for making warplanes—increased severalfold over 1940. Iron ore and pig iron, the backbone of the vital steel industry, reached new levels and the production of ferro-alloys increased about 11 per cent in quantity.

Copper production also established new marks, while chromite, molybdenum, vanadium, tungsten, cadmium, barite, fluorspar, potash, phosphate rock and high-grade clays also achieved record outputs. Domestic manganese



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Four —	1½-cu. yd.	Type AU, light-weight	Bucyrus-Erie buckets,	weight 2,500 lbs.
Three —	1¾-cu. yd.	Type AU, light-weight	Bucyrus-Erie buckets,	weight 3,100 lbs.
Six —	2-cu. yd.	Type AU, light-weight	Bucyrus-Erie buckets,	weight 3,500 lbs.
One —	2¼-cu. yd.	Type AU, light-weight	Bucyrus-Erie bucket,	weight 4,000 lbs.
One —	2½-cu. yd.	Type AU, light-weight	Bucyrus-Erie bucket,	weight 4,250 lbs.
One —	4-cu. yd.	Type AU, light-weight	Bucyrus-Erie bucket,	weight 6,850 lbs.
One —	4-cu. yd.	Type Y, heavy-duty	Bucyrus-Erie bucket,	weight 11,500 lbs.
One —	7-cu. yd.	Type W, medium-duty	Bucyrus-Monighan bucket,	weight 13,700 lbs.

BUCYRUS-ERIE COMPANY
PARTS DEPT. SO. MILWAUKEE, WISCONSIN, U.S.A.

ore production was the largest on record since the last war.

Despite difficulties in obtaining equipment and a large turnover in manpower, bituminous coal production in 1942 reached 576,000,000 net tons, which was a 13 per cent increase over 1941 and nearly equal to the nation's all-time peak production of 579,386,000 tons in 1918, according to preliminary estimates of the Bituminus Coal Division. Pennsylvania anthracite production increased 7 per cent over 1941 and was the highest since 1930. The combined production of by-product and beehive coke was the highest in history and represented a gain of more than 5,000,000 tons over 1941.

Minerals used in construction were on the upgrade generally, with cement sales increasing 10 per cent, sand and gravel up 7 per cent, and stone, about 9 per cent. The exceptions were lime and gypsum, which showed a decrease due chiefly to shrinkage in civilian construction.

• This woodcut by W. A. Rogers will stir the memories of many an old timer. The scene was drawn from an actual street grading job in 1890 at St. Paul, Minnesota.

Graphite and Bauxite Industries Face Revival in Alabama

Alabama's graphite and bauxite industries, somewhat dormant since the First World War, are facing a revival as a result of current war conditions which have shut off imports from Madagascar, it was pointed out recently by Richard W. Smith, acting district engineer of the U. S. Bureau of Mines on the University of Alabama campus.

Valuable because of its present need in America's war effort, graphite, in flake form, is used principally in manufacturing crucibles for melting of alloy steels, brass and other metals.

"Considerable flake graphite was mined in Alabama during the last war," Smith said, "but the industry did not survive the competition of better grade and cheaply-obtained graphite from Madagascar."

It was announced that plans were being made under Smith's supervision for graphite prospecting projects in Clay, Coosa and Chilton counties of Alabama, with laboratories for testing graphite samples to be established at Ashland.

Other effects of the war are being felt by Alabama's bauxite and bauxite clay industry, which, like graphite, is being stimulated by shrinking imports from foreign sources. As an aluminum source, bauxite is of major wartime importance.

More than one-half of the bauxite used in the United States recently has been coming from Surinam and British Guiana in South America.

"If fortunes of war should prevent the bringing in of ore from South America," Smith pointed out, "this country will be forced to use its own bauxite deposits to the fullest extent possible and to supplement them with the use of lower grade bauxite clay and kaolin. For this reason the Bureau of Mines at the university and other experiment stations are developing processes for using lower grade materials."

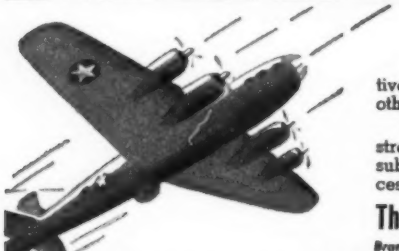
It was stated that actual work in the search for further Alabama area bauxite deposits would begin as soon as the bureau awarded a contract for prospecting.

War Causes Shifts in World Phosphate Trade

Before the onset of World War II international trade in phosphate rock was well established in certain definite channels, moving largely from three major producing centers—North Africa, the United States, and Oceania—to three principal consuming areas—Europe, Japan, and Australia and New Zealand. Two of the producing areas, North Africa and Oceania, exported practically all of their production. The other important producing area, the United States, shipped only its surplus (about a third of its production) chiefly to Europe and Japan. Of the consuming areas, the United States alone was entirely independent in respect to external supplies.

Normal world trade relations in phosphate rock have been almost completely upset by the war's developments. The

FIGHTIN' PUNCH of a Flying Fortress



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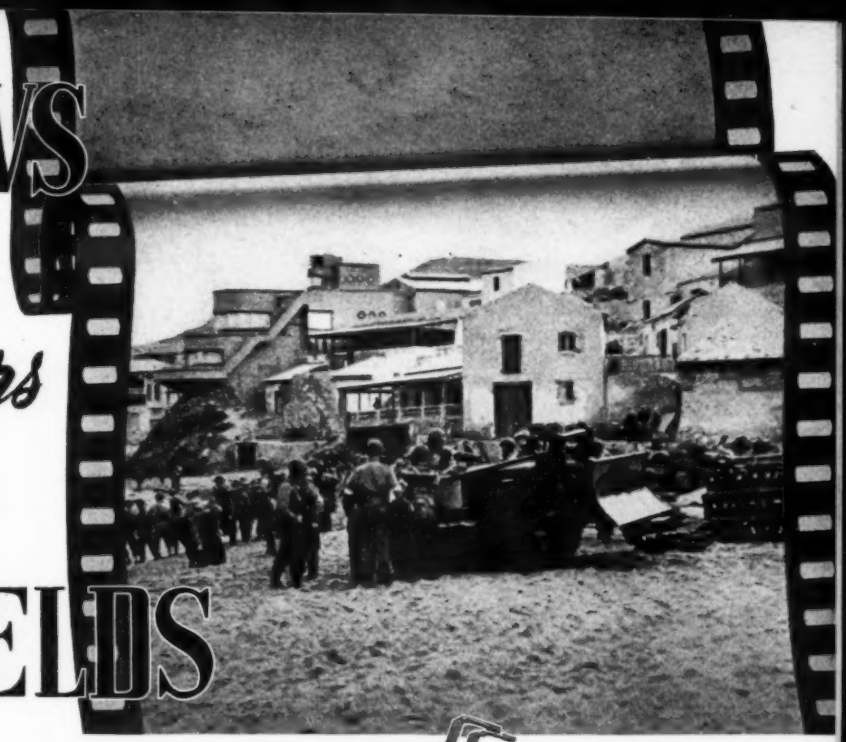

IN this mechanized war, Buckeye tractor equipment has become *battle-front* equipment . . . serving under every conceivable condition, undergoing punishment that puts every part, every feature to the most gruelling test—punishment that no peacetime construction job could possibly equal. The invaluable experience of this world-wide "field test" has not only helped create the better "fighting tools" we need for victory, but also holds the promise of more efficient, faster-working, longer-lasting equipment that will make the building of our new peacetime world facilities an easier, faster and cheaper job.

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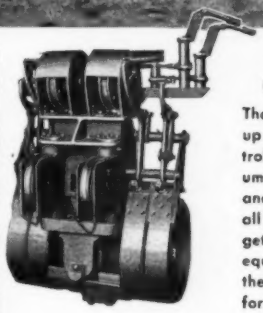

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Balanced weight maintains full crawler contact with the ground for better traction; engineered blade curvature steps up dirt moving ability and saves power. You'll find many other time and money-saving features — write for complete data.

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outbreak of the war between the allied nations of England and France and the German Reich on September 3, 1939, with the consequent British blockade of Germany, brought to a complete stop all exports of American and North African rock to Germany and the territory it controlled in central Europe—Austria, Czechoslovakia, Danzig, and Poland—except those which may have entered through the neutral Mediterranean countries in southeastern Europe.

With the invasion of Norway by Germany in April, 1940, phosphate rock shipments to the Scandinavian countries from the United States ceased, and in May, 1940, the German invasions of Holland and Belgium ended all possibility of further shipments to those countries.

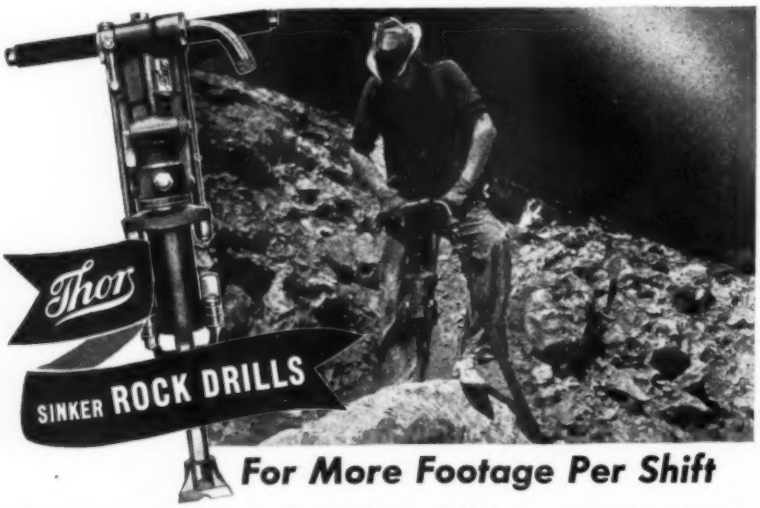
The defeat of France, in June, 1940, had many repercussions in world phosphate rock trade. It stopped the movement to Britain and the Union of South Africa from the North African deposits, normally the principal source of supply for this material, with the result that Great Britain turned to the United States for supplies, and exports of American rock to Great Britain in 1940 exceeded even the large amount sent from the United States to Japan in that year. Large shipments were also made in 1940 from the United States to the Union of South Africa, which normally obtained its requirements from Morocco. Record shipments went also to Canada from the United States, and American rock was sent to Portugal for the first time in many years. As a result of these new demands exports from America were maintained at about 70 per cent of the prewar volume.

The entrance of Italy into the war as an Axis partner, following the collapse of France, stopped the shipments of American phosphate rock not only to Italy but also to those countries, such as Switzerland and Hungary, which had been receiving American phosphates through Italian ports. The defeat of France and the entry of Italy into the war also had a very adverse effect on the phosphate industry of the French possessions in North Africa—Algeria, Morocco, and Tunisia—countries which normally produce about four million tons of rock a year and export about 3½ million tons to Europe. Shipments from French North Africa in 1940 and exports to Europe in that year are stated to have been only about 50 per cent of those of 1939. Shipments were chiefly to France, Italy, and Spain. North African shipments moved to Germany through Italian ports. Exports from Tunisia in the last half of the year and through most of 1941 went entirely to Germany and Italy. Owing principally to the stoppage of Italian commerce through the Suez Canal by the British and to a great drop in shipments to Japan, phosphate exports from Egypt, which in 1938 and 1939 had amounted to over 400,000 metric tons a year, decreased to only 77,069 tons in 1940.

On September 20, 1940, Japan invaded Indo-China, and seven days later joined the Berlin-Rome Axis, resulting in the cutting off of shipments of phosphate rock to Japan by Britain from Egypt, Nauru and Ocean Islands, and Christmas Island.

In 1941 two further major interferences in world trade in phosphate rock occurred. The first was the Germany attack on Soviet Russia in June, 1941, thereby cutting off imports of Russian apatite into Germany, and initiating a movement of the Kola Peninsula apatite from the port of Murmansk to Britain and the United States. The second was the surprise attack on Pearl Harbor in the Hawaiian Islands on December 7, 1941, bringing the United States into the war on the side of Britain, and resulting in the cessation of shipments from the United States to Japan.

Early in 1942 Japan conquered most of the phosphate producing islands of Oceania (Nauru, Ocean, and Christmas Islands), making herself self-contained in this commodity and fully compensating herself for her loss of imports from



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Just as Thor's principle of "Measured Air" assures full efficiency and control, so also does it provide easy handling. With every stroke powered by the same amount of air, operation is smooth and uniform. Naturally, minimum vibration contributes to longer life. Today, on scores of road building, shaft-sinking, tunnelling and other projects Thor Rock Drills are delivering more footage per shift. Ask for details.

A Thor Sinker Rock Drill For Every Drilling Job

7 standard models for light, medium or heavy duty work in the most popular weight classes. Other types available for special applications.

MODEL NO.	TYPE OF SERVICE	WEIGHT CLASS
38	Light Duty	45 lb.
79	Auger Drill	45 lb.
70 Series	Medium Duty	55 lb.
85-B	Heavy Duty	80 lb.

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1741 First Ave., S. Seattle, Washington

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the United States, Egypt, and French possessions. This move by Japan also largely cut off the supplies to the British colonies of Australia and New Zealand, which had come principally from Nauru and Ocean Islands.

The world phosphate trade picture changed again in November 1942, with the United Nations' occupation of the phosphate-bearing areas of French North Africa in Algeria, Morocco, and Tunisia, and the German occupation of the former "unoccupied" portion of France. These events stopped the supplies of North African phosphates going to France, Italy, and Germany, and cut off the entire continental European market except the neutral coastal countries of Spain and Portugal, thus throwing the entire North African production on the remaining vastly restricted world markets in Allied and neutral countries in direct competition with American phosphate rock, and also raising the possibility of an invasion of the American domestic market by the French North African phosphate. The British Isles can now again get their supplies from French North Africa, releasing space on ships traveling from the United States to Britain, and possibly eliminating much of the American export trade in this material. Australia and New Zealand, long cut off from their former sources of supply in Nauru and Ocean Islands, can now be supplied from North African sources, as can also the Union of South Africa.

Thus, at the beginning of 1943, Japan alone of the Axis powers stands self-sufficient in phosphate rock, whereas the European members have been cut off from the U. S. S. R. and all extra-European sources of supply and are limited to small controlled European deposits apparently inadequate for their economy. The Allied nations, on the other hand, have at their disposal the great resources and industries of the United States and French North Africa, a supply far in excess of the needs of both allied and neutral nations of the world.

Synthetic Tire Test Results

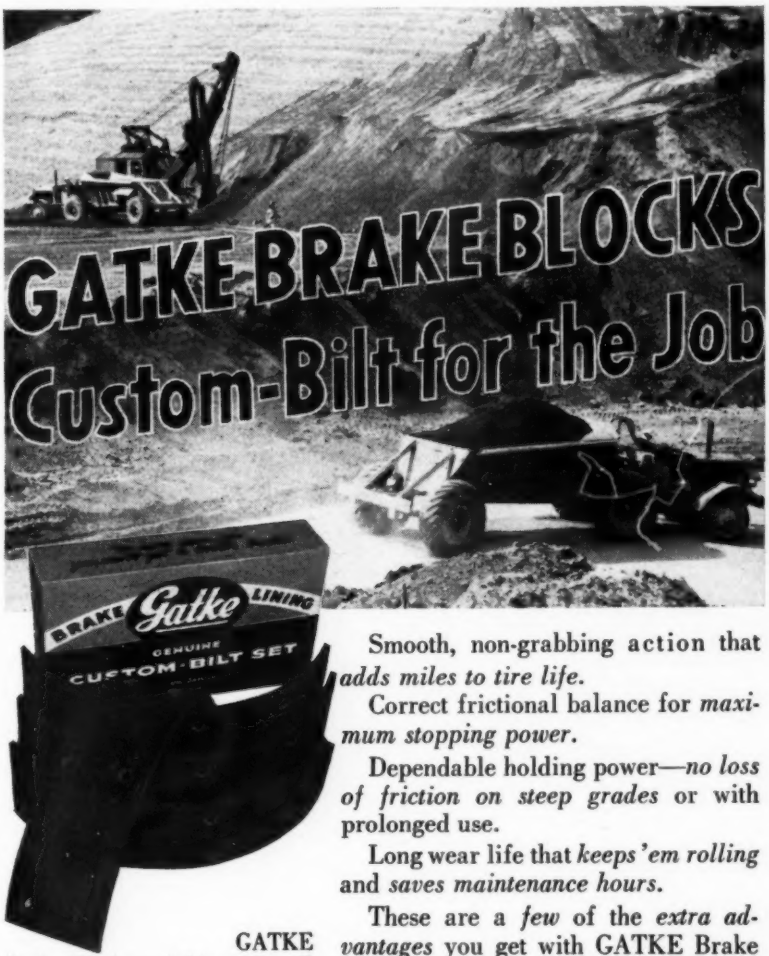
Tires whose rubber content is 99.84 per cent synthetic rubber are now being tested on the highways in various parts of the country, Dr. Howard E. Fritz, director of research of the B. F. Goodrich company, told the Engineers Society of Pennsylvania at a recent meeting.

In discussing the present relative positions of natural and synthetic rubber from the standpoint of their usefulness in tires, Dr. Fritz emphasized that this testing of high-percentage synthetic rubber casings should not be considered as indicating any early public availability of such tires—that it does not affect the nation's tire supply situation at all.

"Experimental development work done with samples of butadiene-type synthetic rubber, the type which makes up the great bulk of the government synthetics program, has already shown up much that is good and several things that are still unsatisfactory about this new rubber," he said.

"Passenger tires and small-size truck tires give excellent service. When we come to large-size truck and bus tires, several difficult problems arise due to the fact that synthetic rubber while running generates more heat than natural rubber, and may fail from that cause in spite of its higher heat resistance. However, we are now hard at work on this problem and are confident it can be solved as we gain more experience in the field."

The speaker recalled that when his company introduced the first synthetic tires offered for general sale in this country—in June, 1940 "as a form of national defense insurance"—they were tires in which synthetic displaced a little more than 50 per cent of the natural rubber. He said that the often-heard question whether synthetic rubber tires will wear as long as natural rubber ones "seems somewhat out of place in the present emergency; nevertheless we can report that our experience to date indicates that on certain types of roads and under certain severe service conditions, synthetic rubber tires wear better than natural rubber ones. On the other hand, there are certain types of service where synthetic rubber does not stand up as well as



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Bulky, cumbersome machinery, and of late heavy pieces of defense equipment must be moved from place to place. In some localities, where low headroom is encountered, this type of Rogers Trailer is used extensively. Large machines, with crawler treads "straddle" the girders thus lowering the overall height by several inches, a definite advantage also in handling many kinds of equipment.

ROGERS LOW BED- HEAVY DUTY TRAILERS

natural rubber. These differences are to be expected."

Admiral Land Commends AGC

Part of the credit for the fact that all shipbuilding records were broken in 1942 by the completion of more than 8,000,000 tons of merchant ships must go to general contractors, Admiral Emory S. Land, Chairman of the United States Maritime Commission, said in the fifth program in the "Construction Goes to War" series of The Associated General Contractors of America.

The program deals with the part which general contractors throughout the country played in the shipbuilding program. It is being presented by radio stations throughout the country in cooperation with AGC chapters and branches.

In a concluding statement, Admiral Land said:

"Much of the success of this nation's greatest shipbuilding program, which is establishing new construction records, is due to the excellent cooperation given the Maritime Commission by general contractors in all parts of the country.

"They have been instrumental in bringing into being shipyards on all coasts and the Great Lakes so expeditiously that we are able to maintain schedules which would have been deemed almost fantastic a few years ago.

"Several general contractors have engaged in shipbuilding. The records they are making speak for themselves. It suffices to say, however, that the general contracting industry can justly claim much credit for America's present status as the greatest shipbuilding nation of all time.

"The contractors have made a most patriotic response to the request of the president for an all-out effort. On behalf of the Maritime Commission, I express appreciation."

Michigan Has Largest Supply of Dolomite Ore

With two and a half billion tons of magnesium-bearing ores in its northern section, Michigan has the largest supply of high-grade dolomite ores in the nation and the basis for a vast new mining industry, according to Dr. R. A. Smith, state geologist.

New estimates of the U. S. Bureau of Mines placing reserve of high-grade dolomites in the Great Lake states as the purest and most accessible in the country were cited by Dr. Smith, who added that the Michigan deposits were the nearest the surface and most accessible to water transportation. He said the Michigan ores yield 19 per cent of their weight in war vital magnesium, 1 to 3 per cent higher than in other deposits.

"There is no reason why they shouldn't be the basis of a great new industry for northern Michigan," he declared. "The deposits are right on top of the ground and can be quarried by power shovel methods."

Dr. Smith said no mining experts knew whether the quarried magnesium would be cheaper to produce than that manufactured from brine, as will be undertaken in several new factories in Michigan.

Location of the Michigan reserves was given by Dr. Smith as follows:

Fifty million tons near the Inland Lime and Stone Company's dock in Schoolcraft County; 180,000,000 tons near Buell Lake in Mackinac County; 135,000,000 tons near Engadine; 200,000,000 tons near Garnet; 200,000,000 tons near Ozark; 630,000,000 tons near East Lake in Chippewa County; 50,000,000 tons near the mouth of the Pine River; 410,000,000 tons near McNamara; 350,000,000 tons from McGregor to Patrick and south to Bush and McKay Bays; 22,000,000 tons near Goetzville; 10,000,000 tons near Detour, and 290,000,000 tons on Drummond Island.

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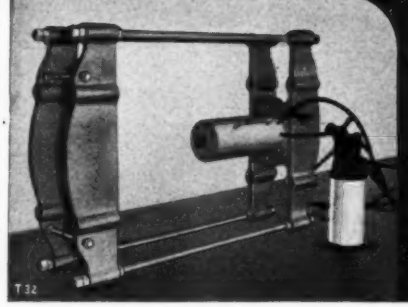

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SOUTH MILWAUKEE WISCONSIN

T 32

Alcan Highway

(Continued from page 125)

trucks; one truck with portable arc and gas welder; and one heavy trailer for hauling equipment.

Much of the select material and crushed rock used for surfacing the highway near Fort St. John has been produced by Southern Minnesota Construction Company of Spring Valley, Minnesota. At one pit 14 miles from Fort St. John and four and one-half haul miles away from the Alcan highway, this firm had removed 200,000 cubic yards during the summer and fall and by mid-November had already stockpiled 15,000 cubic yards of one-inch gravel and 9,000 cubic yards of two-inch gravel which will be available for immediate use when needed. During the past winter, an additional 75,000 cubic yards of gravel from this pit was stockpiled.

Aggregate in the vicinity of Fort St. John is a good mixture of clay and sand, easily compacted and is being used as top lift for between 30 and 40 miles of the highway. Select material from the pit is hauled directly to the road and used as the first lift on the sub-grade. From another area in the same pit, gravel is removed and run through crushers, being stockpiled in one-inch and two-inch sizes.

Equipment operated continuously 22 hours a day is subjected to strain and wear in an extreme degree. Southern Minnesota met the problem of keeping the machines in operation with preventive maintenance. During each shift or during the few off hours, each piece of equipment used by this contractor was greased and lubricated. Mechanics and portable repair shops were on location at the several borrow pits, ready to make minor adjustments and replacements and to inspect the equipment at regular intervals.

At two pits being operated by Southern Minnesota during early winter work, the firm was using a pioneer No. 24 crusher with two Allis-Chalmers power units; a Lippmann crusher with one Allis-Chalmers power unit; one Lima ¾-yard shovel; one Gopher ½-yard shovel; one ¾-yard Speeder shovel and 47 trucks, including specially built Thornton drive models.

Roverud Brothers Move In

One of the last firms to move on the Okes sector of the Alcan military highway project was Roverud Brothers of Spring Grove, Minnesota, who hold a contract for production of crushed rock. Roverud located a likely quarry on the bluffs overlooking the Peace River north from Fort St. John by piloting a cat on an exploratory mission some two and one-half miles through the trees and rocks between the highway and the river. At this location, a quantity of partially exposed sandstone offered access to the rock with a minimum of stripping.

A scraper and blade broke through a truck haul road between the highway and the quarry, and the equipment to be operated throughout the winter by Roverud was set up. Operations at this location were running full blast in mid-November with a

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You will find a saving in steel because of its longer life; by the same token you also save time, as replacements are less frequent. And the sum of the two savings is greater economy.

The consistent top-flight performance of Preformed "HERCULES" *(Red-Strand)* Wire Rope is not a matter of chance. Like all wire rope bearing this well-known name, it is made of acid open-hearth steel wire . . . selected by rigid tests to make sure that it meets our exacting requirements. It is then carefully manufactured according to sound fundamental principles.

The more hours of work you can get out of every pound of wire rope you use, the more steel you save for other vital war purposes. Regardless of the kind or make of wire rope you now have, it will not be able to give you the full service of which it is actually capable unless it is handled correctly and operated under proper working conditions. For further information on the proper use, care and application of wire rope, feel free to consult our Engineering Department.

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• Thomas H. McDonald (left) PRA commissioner and District Engineer Bright, are directing the operations of 52 contractors employing over 6,000 men on the Alcan highway.

General Invincible ¾-yard shovel loading hunks of blast-loosened sandstone to two Koehring Dumptors and Thornton tandem drive Ford trucks which shuttled between the shovel and the hopper to the crusher. Ready to start operations in the pit, but not yet working were a Northwest 1½-yard shovel and a Unit ½-yard shovel. The crushing plant was made up of a Wisconsin Badger primary crusher with Waukesha power unit, and a Pioneer No. 110 crusher with a Wisconsin power unit. Hauling the two and one-half miles from the pit to the highway and for a distance of several miles up and down the road is a fleet of 15 Chevrolet, Ford and Thornton tandem drive Ford trucks.

This sandstone, although crushing readily in one-inch and two-inch sizes, is difficult material in which to work. During mild weather, the stone is extremely abrasive to the cutting edges of the drill bits and dipper teeth, rapidly grinding them away. In cold weather, the porous sandstone absorbs moisture, freezes into hard, solid pieces, and becomes even more difficult to handle at the quarry.

Constant maintenance of equipment is essential in this tough work to keep the fleet of trucks, the crusher and the shovels operating without costly and lengthy delays for repairs. Oil in all units operated by Roverud is changed every 68 hours, machines are regularly inspected and lubricated by on-the-job mechanics. The preformed cable on the shovels is inspected regularly for signs of wear due to the abrasive action of the sandstone. Lubrication of the cable at regular intervals extends the working span of the rope.

At this pit, Roverud is scheduled to crush approximately 150,000 cubic yards of one-inch and two-inch rock for the top lifts on the Alcan highway. With the crushing plant running at capacity day and night, rock not needed immediately on the highway is creating a large overflow stockpile which will be available next spring.

Along the southern sector of the Alcan highway, thousands of feet of laminated timber culverts are being laid to insure proper drainage, especially during the spring break-up and early summer rains. These sectional, Laminex culverts which are assembled right on the job, average about ten to a mile. All culverts on the Okes management sector of the highway are being laid by Pederson Brothers of Montevideo, Minnesota, who also hold the structural contracts for two permanent bridges being built this winter over the Sikanni river at Milepost 117 and over the Muskwa river near Fort Nelson. Pile driving for the Sikanni river bridge was well along in November and materials were hauled to the job site of the Muskwa river bridge early in December. It is expected that work will be completed on both structures before the first of April.

These contracting firms and the other sub-contractors on the Okes sector of the Alcan highway project in full cooperation with the United States Army, faced with one of the most difficult assignments ever given private contractors, did the impossible and built the southern sector of the Alcan highway in record time. Within four months from the day preliminary operations were started, the entire 260 mile section between Fort St. John and Fort Nelson, and many miles beyond Fort Nelson, had been graded. All but 15 miles of the section between Fort St. John and Fort Nelson was surfaced with one lift of gravel and over many miles, the final lift of one-inch and two-inch gravel had been spread. Through many stretches between Fort St. John and Fort Nelson, army trucks this winter rolled over as broad and smooth a road as could be found anywhere in the Northwest.

Alcan Highway Bridges

On its 1600-mile course between Dawson Creek, British Columbia, and Fairbanks, Alaska, the Alcan highway crosses hundreds of small streams and gorges as well as the channels of many swift, wide rivers. The channel of the Peace River 16 miles below Fort St. John

• An Allis-Chalmers tractor, equipped with a Gar Wood bulldozer, clears away debris at one of the camp areas about 50 miles north of Fort St. John.

at its narrowest point is as wide as the Mississippi river at Minneapolis (varying from 400 to 600 feet). The waters of the Muskwa and the Sikanni rivers between Fort St. John and Fort Nelson are swift with the current rushing on at a rate between 25 and 30 miles an hour. Although grading and graveling posed problems of almost overwhelming proportions, the building of the Alcan highway bridges certainly was not the least of the contractors many problems.

Last summer when Army engineers pushed through the uncharted wilderness and encountered unfordable streams, one-way pontoon bridges anchored at each shore were thrown across the rivers. These pontoon bridges served the Army and the contractors while temporary bridges of native timber pilings were erected to carry the traffic through the summer and fall.

Sawmills which had been set up through the forests early in June turned out stringers, boards and piles from the native timber and crews of the contractors and the Army engineers cooperated in building temporary spans. These first one-way bridges were never conceived as anything but temporary and were erected with the expectation that ice floes would carry sections of them away. Among the first of these temporary bridges were spans of timber piles over the Muskwa and Sikanni rivers as well as shorter bridges of from 20 to 30 feet over many smaller streams.

At the Peace River crossing below Fort St. John, the Alcan ferry was used during June, July, August and September to carry great quantities of equipment, materials and supplies between the shores. As winter approached, however, Army engineers foresaw months when ice which would prevent the ferry from operating still would not be strong enough to bear the weight of loaded trucks. The army requested the Okes Construction Company to build a temporary bridge over the river to be used during the interval between suspension of the service of the Alcan ferry and the freeze-up of the river.

The Okes Construction Company selected Tom Lepard, one of their supervising engineers who had a reputation for trouble shooting and told him to get started. Without plans or specifications, but with the assistance of experienced crews, both from the contractors and from the Army, Lepard's men and machines went to work. On September 23, when the Peace River temporary bridge was started, the Army asked that it be completed within 30 days. Just 26 days later, traffic was flowing over the 900-foot long bridge. The speed and efficiency with which the building of the bridge had been handled led to the christening of the span as the "LePard Bridge."

For a month, there was a surge of traffic day and night over the LePard bridge as supplies came in to Fort St. John and as the Army's "Fairbanks Freight" convoys started moving out of Dawson Creek. In mid-November, however, chinook winds from the Pacific brought unseasonably warm weather to the Fort St. John area and great floes of Peace

WILLIAMS Buckets
WELDED ROLLED
STEEL CONSTRUCTION
for LONGER LIFE
MULTIPLE ROPE & POWER ARM TYPES
DRAGLINE • POWER WHEEL • DREDGING
STEEL MILL BUCKETS
3/8 yd. to 16½ yd. capacity
WILLIAMS Buckets
Send for free bulletin covering types of buckets for your particular requirement. It shows details of design and many exclusive features that clearly prove why your next bucket should be a Williams.
ARMY E NAVY
THE WELLMAN ENGINEERING CO.
7002 Central Avenue • Cleveland, Ohio
BUILT BY WELLMAN

• Footing piles on the bank of a river crossed by the Alcan highway are driven by a barge-mounted pile driver. (Public Roads Administration, F. W. A. Photo.)

River ice were loosened. The LePard bridge spans the Peace River at its narrowest point and in this bottleneck floe upon floe of ice piled up, battering away at the piles. One afternoon a 350-foot middle section of the temporary bridge shot into the air and traffic was effectively halted.

The bridge had already served its purpose for a month and the Army had been provided with the means of rapidly transporting their supplies between Dawson Creek and Fort St. John. But the engineers were determined that this free flow of traffic so lately inaugurated should be continued and on the same afternoon the bridge went out, new piles and timbers were being loaded on trucks and pile driving equipment was on its way to LePard bridge. Less than a week elapsed until the damaged section of the bridge had been replaced and trucks were once again roaring freely along on their way to Alaska.

Permanent Bridges

This temporary bridge over the Peace River was replaced this winter with a permanent span of reinforced concrete and steel. On the Okes sector of the highway between Fort St. John and Fort Nelson, in addition to literally hundreds of treated timber culverts and smaller timber bridges, two large permanent spans are being built. Temporary timber pile bridges over the Sikanni river at Milepost 177 and over the Muskwa river near Fort Nelson, similar to the Peace river crossing, were erected for use only during the summer and fall until the permanent bridges could be built. When the writer visited the Alcan highway, ten contractors for bridge and culvert construction under the Okes management contract had started pile driving on the Sikanni and were hauling materials to be used in construction of the Muskwa river bridge.

The Muskwa river permanent bridge was built during winter days with the temperature consistently between —30° and —50°, not a task for anyone susceptible to the rigors of Arctic winters. Aggregate for the concrete to be used in the Muskwa bridge is being taken by dragline from the channel of the river and steam-washed. Coffer dams will be sunk for bridge footings and steam jets will be shot into the coffer dams to protect the concrete from freezing.

The permanent bridges will be all the word implies and there will be no danger of ice floes carrying away sections of these spans. On the Muskwa river bridge, 600 piles, each 35 feet in length, are being driven into the river bed. The footings for the bridge will extend from the surface of the river for 30 feet to the tops of the piles with the bridge floor to be 40 feet above the winter level of the river. During the spring and summer, the water rises until in June the peak crest is 30 feet above the winter crest.

The Muskwa river bridge of steel and concrete will include 10 spans. The completed bridge will require 4,000 cubic yards of concrete and 1,500 tons of steel. Most of the steel being used in the construction of this bridge is coming from bridge structures which are being dismantled in the United States and shipped, piece by piece, to the Muskwa river thousands of miles away.

The second main permanent bridge on the Okes management sector of the Alcan highway is a bridge of treated timber piles over the Sikanni river. This bridge will include 12 spans. The Sikanni bridge, rising 30 feet above a stream which will have a June crest 20 feet above the present water level, is founded on treated timber piles each 65 feet long. One hundred and thirty of these long piles have been driven to support the permanent span over the river. The wooden spans of the bridge will be prefabricated and will arrive at the job site ready for assembling.

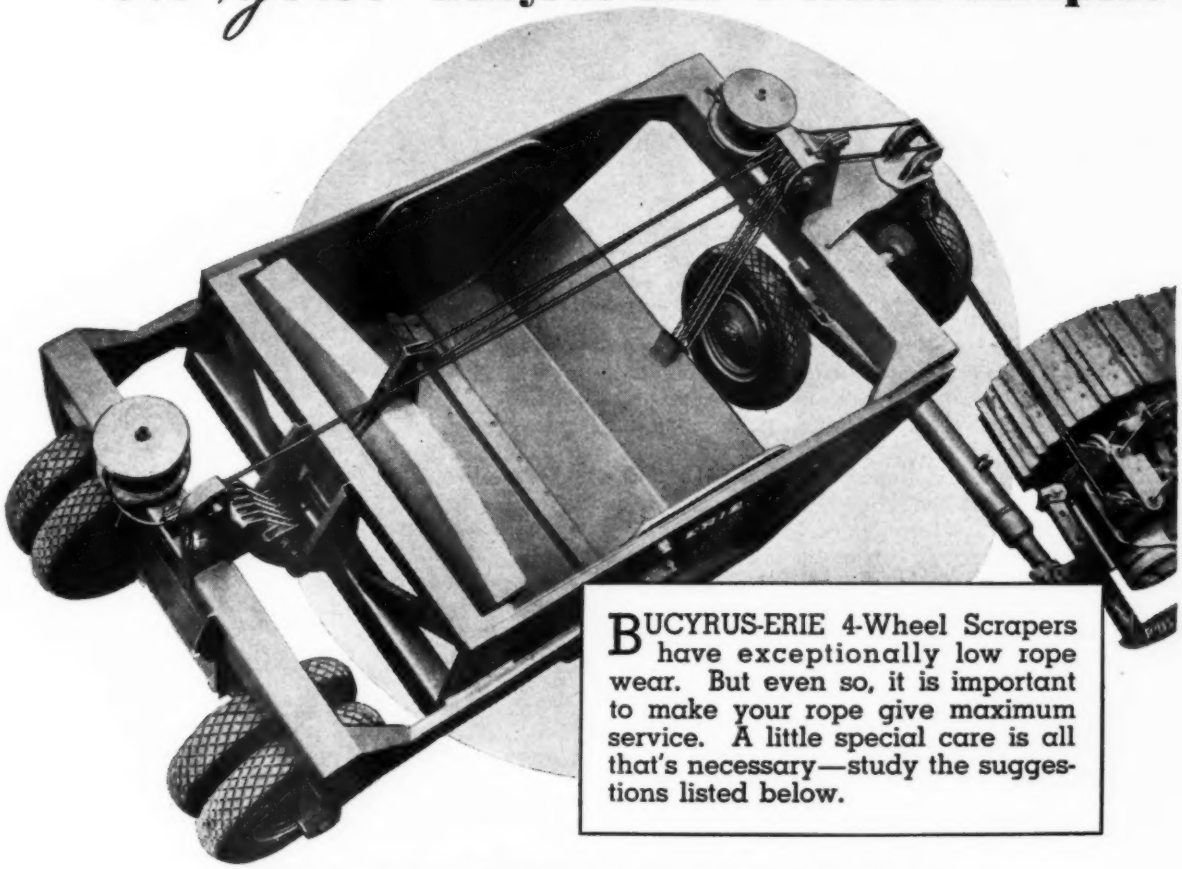
These structures over the Sikanni and the Muskwa rivers are typical of permanent bridges being constructed this winter along the length of the road. It is expected that work will be completed on both the Muskwa and the Sikanni bridges before the first of April.

Equipment Maintenance

From the start of construction activities on the Alcan highway,

• This Dawson Creek livery stable operator evidently believes in frank advertising. Note gas pump at the left, first concession to the automobiles that some day will stream through this town.

It's *Easy* To
PROLONG ROPE LIFE
on your Bucyrus-Erie 4-Wheel Scrapers



BUCYRUS-ERIE 4-Wheel Scrapers have exceptionally low rope wear. But even so, it is important to make your rope give maximum service. A little special care is all that's necessary—study the suggestions listed below.

FOLLOW THESE SIMPLE RULES

1. Check all the cable leads regularly to see that ropes are properly aligned to prevent any undue rope wear.
2. Disassemble and clean the sheaves regularly so as to keep them working smoothly and prolong their life.
3. Replace sheaves when they become worn to a point where they may damage rope. Bucyrus-Erie sheaves are identical and interchangeable on most models.
4. If a sheave-stand becomes bent be sure to straighten it immediately, before the off-lead damages or cuts the cable.
5. Save cable by avoiding unnecessary stress. Do not travel with ejector, apron or bowl hoisted to extreme height.
6. Your International TracTracTor Distributor is equipped to do a service job as never before to help you prolong the useful life of your equipment.

BUCYRUS ERIE TRACTOR EQUIPMENT

SEE YOUR INTERNATIONAL TRACTRACTOR DISTRIBUTOR

• Newly dumped gravel is spread over the grade of the Alcan highway by a Caterpillar grader and tractor.

tractors on the road have erected it has been one long, continuous struggle to keep the equipment in repair and working. Isolated as the roadbuilders have been from adequate sources of supply and replacements, they have managed through exercise of native ingenuity and resource to make repairs which seemed next to impossible.

The lack of transportation and communication facilities both contributed to the parts bottleneck on the Okes management contract. Although Okes purchasing agent, Ken Gold of St. Paul, worked day and night to preserve a good stock of the most essential parts, it invariably developed that when a tractor or truck broke down, there just weren't the particular replacements at hand with which to make the repairs.

The record which the men who built the Alcan highway established in the speed of construction and in completely overcoming all natural obstacles has been so startling that one might easily be misled into the thought that an abundance of repair items made an easy task of equipment maintenance. The machines have been kept moving only because every one in the repair shops from superintendents right down to mechanics set themselves to the task of making almost any conceivable part from whatever happened to be at hand at the moment.

The main repair shop on the Okes management contract sector of the highway is located at Fort St. John and is in charge of C. M. Gillespie, superintendent of equipment. Here 80 men work day and night, constantly tearing down worn out machines and replacing and rebuilding. This garage and repair shop was erected from double sections of CCC camp buildings to provide the desired height. The building has overall dimensions of 50 feet by 150 feet with an L measuring 50 feet by 50 feet housing a grease and wash rack. Immediately off the garage building is a shed housing a Palmer 50 KVA generator and an International TD-18 power unit provides electricity for the entire camp.

The repair section of the garage is equipped with four lathes, the largest taking a 16-inch swing. These are invaluable in rebuilding shafts. A shaping machine, used for many jobs is especially valuable in making parts from whatever scraps of metal are at hand. Other equipment includes a piston turner and grinder, a drill press, two milling machines, a small forge and welding outfits.

In the greasing section at the garage, there is a steam jenny used to clean off the equipment, a heavy duty grease hoist and high pressure as well as hand greasing guns and lubricators.

A second main garage and warehouse on the Okes management sector of the highway is located at the Sikanni river camp and, although smaller, is well equipped to take care of most repair work. Many of the sub-contheir own garages which, although not as completely outfitted as the shops at Fort St. John and at the Sikanni, are equipped to make many important repairs to the roadbuilding equipment. Traveling repair shops with stocks of equipment ranging from welding outfits to lathes range the highway "on call" and make repairs in the field.

Some of the work that has been done to keep the equipment on the job has been unusually resourceful. Last summer, for example, when idling jets for trucks were unobtainable, mechanics whittled them from pieces of wood. Another time when generator brushes burned out, they were made from the bark of trees. A commonplace had been the manufacture of washers from sections of hose.

Welding Equipment Important

The job just couldn't have been accomplished without welding outfits. There are 23 outfits in operation at the two main repair shops as well as dozens in the other contractors' shops and in the field. When the first equipment on the highway arrived, it was shipped by air. Planes carried everything from portable lighting plants to power shovels. One of the first tractors to arrive at Fort St. John was too bulky to be carried in one plane. Welders at the shipping end split the tractor in two; welders in Fort St. John went into action as the two sections arrived and put the tractor back together again.

To enable the planes to fly in the power shovels, treads were removed from the units, cabs dismantled, booms cut in two to reduce them to lengths that could be accommodated on planes, and the component parts flown to the highway. Again the welders went to work, rejoining the sections and welding the shovels back together again.

Welding outfits were everywhere. On-the-job repairs were made during construction operations. Sprockets and shafts were cut from discarded parts to avoid delays in obtaining new replacements. One welder literally hung by his toes to cut an entire section from one crushing plant so that a

conveyor from a unit of another manufacturer would fit.

In the repair shops the accomplishments have been just as remarkable. Parts have been manufactured in the shop forge and on the shop lathes that would do credit to a well equipped and completely stocked machine shop in some industrial center. Lower track roller pins have been manufactured for shovels, roller chain sprockets have been devised, gears have been forged and recut, belt pulleys have been manufactured, valve inserts have been built up when new valves couldn't be obtained, and when no cable clamps were available, eyes were spliced on the cables.

No part, however broken down or worn out, is discarded. Gears with broken teeth which would be thrown away in any machine shop in the United States are saved and rebuilt. If the rear end from a truck of one make goes out, more often than not the rear end of a broken down truck of some other make is rebuilt and refitted. Connecting rods that have been burned out are rebabbitted, put in the lathes and turned out for reuse.

It is the same story with machine tools. When the proper equipment for handling repair work isn't at hand, tools and wrenches are manufactured on the job. If a tractor requires a special wrench, the men in the shop manufacture it. Rather than discard Canadian acetylene outfits which didn't fit American equipment, mechanics made their own special adaptors and placed all units in service.

Preventive maintenance is, of course, the order of the day on the Alcan highway, but on the job no amount of preventive maintenance could avoid major breakdowns. The operations are continuous with equipment idle only two or three hours during each 24 hour period. The work is unusually hard on the equipment because the material which is handled is rough and heavy. Speed in building the grade and getting out the aggregate has been the most important factor and consequently, the equipment hasn't been pampered.

The preventive maintenance which has been practiced has, however, gained many hours of productive operations that otherwise would have been lost. Equipment the length of the contract is greased and lubricated at least once during or before each shift. Oil is changed frequently—at one camp, equipment operators were constantly reminded to keep records and change oil every 66 hours.

This winter, although grading and many other operations on the Alcan highway have been shut down by the severe weather, the mechanics and the grease monkeys continued hard at work, completely checking and servicing all the heavy roadbuilding equipment. These ground crews for the roadbuilders are playing an important part in the building of this great wilderness road.

How Much Dormant Scrap Have You?

(*Continued from page 127*)

vaged; everything else should be given its chance to make up the shells and tools of war needed to smash the Axis.

Don't forget for a minute that scrap, a lot of it, is still desperately needed. Our steel ingot war-capacity was stated before as being 90,000,000 tons. Actual *production*, however, has been around only 85,000,000. Every hour that steel production remains less than steel capacity, postpones the day of victory. And unless the supply of scrap is greatly increased, we shall find many of our furnaces shut down for lack of material to make into steel.

It's squarely up to every one of us to get out this critically needed material that is rusting away in mines, quarries, contractors' yards farms, factories, homes and places of business to the tune of 8 to 10 million tons. Enough to offset our present loss of production; enough to boost our war output of steel up to a victory level.

Remember Uncle Sam's Salvage Program is not a one-week or one-month campaign any more than this is a one-week war. Salvage is an all-out, continuing, day-to-day effort.

Your scrap has work to do—will you give it a chance?

Chicago Scrap Handler

(*Continued from page 129*)

Metal has done a neat job of extending the crane's cab to house the generator for the electric magnet. Besides its trim appearance this "built in" feature has paid dividends in the efficiency of the generator by shielding it from weather and operating wear and tear.

The services of a rail-mounted Industrial Brownhoist crane are also available at the yard for loading and unloading duties. A Universal truck crane is sent out by the company on demolition jobs where the truckers need heavy lifting assistance.

An important part of Apex Iron & Metal's equipment is a scrap iron baler used to prepare tin and light scrap for shipment to the steel mills. Capable of applying 1,500 pounds per square inch pressure, this unit compresses the scrap iron into 600-pound bales. These bales are loaded by conveyor belt to waiting railway cars. Three alligator shears are used to cut up the heavier scrap iron to mill specifications.

M. A. Arstein is the owner of Apex Iron & Metal Company and C. A. Mogilner the manager.

Tideland Shipyard

(*Continued from page 131*)

the dirt on this job are the eight RD 8 Caterpillar and 12-yard LeTourneau scraper units used for the original moving of the hill that was used in filling a useless bog into a square mile of industrial site.

The De Velbiss Company did an expert job on this earth moving project which was completed in less than two months. A total of approximately 710,000 yards was moved, 210,000 from the basins, and 500,000 from a small hill that was levelled.

One dredge rented by the day, was used for the dredging work in the harbor.

Once built, the concrete barges are very nearly ready for actual use, since there is no problem of installing complicated marine machinery.

New trade literature

Title: **"Kotal"**
Subject: A new descriptive manual concerning the use of Kotal asphaltic material. An interesting presentation of water-proofing and bituminous binding methods. Illustrated profusely with photographs and humorous sketches.
Where to Get: Kotal Company, 52 Vanderbilt Avenue, New York City. Free upon request.

Title: **"Typical Examples of B. F. Goodrich Development in Rubber"**
Subject: This booklet consists of reproductions of 26 advertisements by the Goodrich Company during the last year. Informative copy and clear photographs add to the interest of the subjects dealt with.
Where to Get: The B. F. Goodrich Company, Akron, Ohio. Free upon request.

Title: **"General Engineering Handbook"**
Subject: The primary purpose of this book is to present in one volume the important fundamental data relating to all branches of engineering, avoiding any attempt to replace the more voluminous works in specialized fields. The book is divided into nineteen sections each covering an engineering phase in a compact "meaty" form. Over one thousand pages.
Where to Get: McGraw-Hill Book Company, New York City. Price $4.00.

Title: **"Quarterly Digest of Current Asphalt Literature"**
Subject: A condensed resume of the principal articles on asphalt and asphalt paving appearing in current engineering, trade and official periodicals in the United States, Canada and foreign countries, during July, August and September, 1942.
Where to Get: The Asphalt Institute, 801 Second Avenue, New York, New York. Free upon request.

Title: **"Quick Guide to the Lubrication of LeTourneau Equipment"**
Subject: This lubrication chart explains what points need lubrication, what lubricants to use and how often to lubricate to keep your LeTourneau equipment operating efficiently. The poster-size chart, 16 x 20 inches, is boldly designed in big, readable type especially for mounting on construction shack or maintenance shop walls. All main lubrication points are plainly numbered and keyed to equipment illustrations.
Where to Get: R. G. LeTourneau, Inc., Peoria, Illinois. Free upon request. Ask for Bulletin G-1052.

Title: **"A Guide To Better Bearing Lubrication"**
Subject: A 32-page lubrication manual filled with designs, formulae, and graphs which explain the highly technical text. Subjects treated include the functions of lubrication, recommended viscosities, oil supply systems, grease lubrication, greasing intervals, protection of machinery, cleaning, and many other important phases of bearing lubrication.
Where to Get: SKF Industries, Inc., Front Street and Erie Avenue, Philadelphia, Pennsylvania. Free upon request.

Title: **"Keep 'Em Working"**
Subject: Supplementing operators' instruction books, this booklet gives the reasons behind the maintenance and operation instructions, goes into greater detail in the care of critical parts and gives information that is not conveniently available elsewhere.
Where to Get: Caterpillar Tractor Company, Peoria, Illinois. Free upon request. Ask for Form No. 7609.

Title: **Manganese Steel For The Steel Industry"**
Subject: A comprehensive 47-page bulletin dealing with the properties of manganese steel, its qualities, uses, etc. Steel is followed through various phases of operation. The subject deals mainly with uses in the steel industry.
Where to Get: American Manganese Steel Division Of The American Brake Shoe & Foundry Company, 389 East 14th Street, Chicago Heights, Illinois. Free upon request.

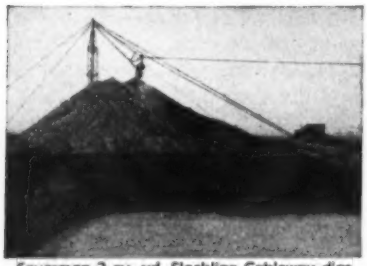
Title: **"Stresses In The Corner Region Of Concrete Pavements"**
Subject: This 96-page booklet is compete with charts and graphs demonstrating theories and tests covering corner stresses. As a result of this research, stresses in the corner regions of concrete pavement slabs now may be calculated by means of a relatively simple working formula, which is believed adequate for design use. This formula was developed by M. G. Spangler, Research Associate Professor of Civil Engineering, Iowa State College.
Where to Get: Iowa Engineering Experiment Station, Iowa State College, Ames, Iowa. Free upon request.

Title: **"Steam Hose"**
Subject: A revised catalog section containing simple, easy-to-read rules for the care and maintenance of steam hose, so vital now that rubber is so scarce, as well as detailed instructions on the proper methods to attach couplings, etc. Data on inside and outside diameters, weight and number of piles also are listed.
Where to Get: The B. F. Goodrich Company, Akron, Ohio. Free upon request.

Title: **The Hobart Group**
Subject: A 20-page booklet printed in three colors, which editorially and pictorially explains the products,

Handle More Yards per Dollar

Small Sauerman Drag Scraper stockpiles crushed silica rock on ground alongside washery and reclaims this stored material when and as required to drying plant.



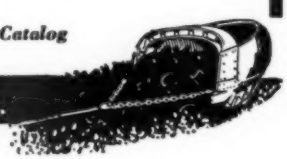
Sauerman 2 cu. yd. Slackline Cableway digs a 40,000,000-gal. reservoir in 154 days, placing all the spoil in one long, high pile.

For over 30 years SAUERMAN Cableway Excavators, Power Drag Scrapers and Tower Machines have dug, moved, and placed earth, gravel, clay, blasted ore, sand, rock and coal on thousands of different jobs all over the world.

Increase your profits by taking advantage of the economies available with SAUERMAN Machines such as: versatility and speed, one-man operation, extremely low power and maintenance costs, and reliable, steady service.

These machines are built in a wide range of sizes with capacities up to 1,000 tons per hour and operating spans up to 1500 ft.

Write for Catalog



SAUERMAN BROS., Inc.
574 S. CLINTON ST., CHICAGO

manufacturing and engineering facilities and wartime activities of the companies making up the Hobart group of factories. Many photographs show applications and possible uses for Hobart products in wartime and peacetime activities.
Where to Get: Hobart Brothers Company, Troy, Ohio. Free upon request.

Title: **Pumpcrete**
Subject: A 24-page catalog, descriptive of the Rex Pumpcrete. In the bulletin is found not only technical data concerning how to operate and how to set up a pumpcrete system but also interesting pictures of jobs that the pumpcrete is doing or has already done. Many varied applications are shown and accurate specifications are included for three sizes.
Where to Get: Chain Belt Company, Milwaukee, Wisconsin. Free upon request, ask for bulletin No. 404.

Title: **"Motor Record Card"**
Subject: Available to all maintenance engineers, this motor record card, of convenient size (4 x 6 inches) for card files, contains spaces on both sides for the recording of essential information on each motor as well as the nature and extent of inspection and repairs. By using this card, excessive amounts of attention or expense will show up and the causes can be determined and corrected.
Where to Get: General Electric Company, Schenectady, New York. Ask for GES-1526A. Free upon request.

Title: **"The Life Story of a Bearing With a 30 Year Background"**
Subject: A new 16-page booklet which explains the manufacturing procedure in renewing worn ball bearings. Running in two colors and profusely illustrated, the booklet ties in closely with the WPB conservation of parts program.
Where to Get: Ahlberg Bearing Company, 3025 West 47th Street, Chicago, Illinois.

Title: **"Selecting Controls for Fuel Conservation"**
Subject: A 16-page booklet which explains in everyday terms different types of firing, the fundamental rules and formulae which govern the proper burning of fuel and the utilization of heat, and offers suggestions for the selection of equipment with which the most efficient use of fuel can be attained. The manual is divided into five major divisions; the first is concerned with natural draft coal burning; the second covers automatic stoker firing; the third explains chain grate and spreader stoker operation; the fourth discusses forced draft hand firing; and the fifth takes up natural draft oil burning. Each type of installation is illustrated with carefully planned drawings.
Where to Get: The Hotstream Heater Company, Combustion Equipment Division, 8007 Grand Avenue, Cleveland, Ohio. Free upon request.

Notes from the manufacturers

Buda Company, Harvey, Illinois, announces the appointment of R. C. Wietersen as director of purchases for the Buda Company. Mr. Wietersen is in complete charge of purchases of equipment and material for all products of the company. He was director of purchases for the National Supply Company for the past two years and for four years prior to that he was director of purchases at the Hercules Motors Company.

Hercules Motors Corporation, Canton, Ohio, announces that the men and women of that corporation were granted the Army-Navy "E" for production excellence. The presentation was made in a formal ceremony at the Canton plant on January 11, by Colonel Harold M. Reedall.

E. I. Du Pont De Nemours & Company, Inc., Wilmington, Delaware, announce that the company was presented with a special award of honor "for distinguished service to safety" early in January by the National Safety Council. In presenting the award, Colonel John Stilwell, president of the Council, said that the company had one of the finest safety records ever made by any industrial organization in the history of the United States.

The B. F. Goodrich Company, Akron, Ohio, announces that Chester F. Conner, sales distributor manager, Industrial Products Division, has been appointed to the staff of advisers on mechanical rubber goods in the Office of Rubber Director, War Production Board, Washington, D. C.

Allis-Chalmers Manufacturing Company, Tractor Division, Milwaukee, Wisconsin, announces three important promotions involving changes in the company's sales and engineering organizations. They are A. W. Van Hercke, from sales manager to assistant manager of the Tractor Division, A. F. McGraw, from sales promotion manager to general sales manager, and R. A. Crosby of the advertising department, temporarily loaned to the Salvage Section of the WPB, will be advertising manager.

Caterpillar Tractor Company, Peoria, Illinois, announces that James E. Deaderick, assistant general parts manager of the company since February, 1941, has been named a vice president of the company with administrative direction of the parts, service and traffic departments.

Esso Marketers announce that William P. Headden has been named supervisor of the fuels and lubricants section of the engineering division of the company. Mr. Headden has been active in the engineering division of the company for fourteen years. Charles W. Bohmer has been appointed assistant supervisor of the fuels and lubricants section.

The Marmon-Herrington Company, Inc., announces that A. W. Herrington has been elected a director of the Army Ordnance Association. Mr. Herrington, in addition to being chairman of the board of directors of the company, is a past president of the Society of Automotive Engineers, a governor of the Society of American Military Engineers and a director of the Gar Wood Company. He was technical adviser to President Roosevelt's Economic Mission to India in 1942.

Peerless Pump Division, Food Machinery Corporation, California, announces the appointment of Dan R. Rankin as acting chief engineer of the company. Mr. Rankin has been associated with Peerless for the past five years and previously was assistant to the chief engineer.

POSITIONS WANTED

Address all box numbers c/o EXCAVATING ENGINEER South Milwaukee, Wis.

Operate steam, gas, electric; standard or full revolving shovels. 45 years experience. Will go anywhere. Good references. Box 9201

MASTER MECHANIC

Wanted position as master mechanic of all heavy equipment. Steam Gasoline Diesel or Electric. Shovels, cranes, draglines, and tractors. 30 years experience in construction work of all kinds. Can handle men. 2 years in South America. Now located Wisconsin. Box 9205

SHOVEL-CRANE OPERATOR

Power shovel & crane operator. Over 25 years experience on gas, diesel, steam, electric, and air-shovels, cranes, draglines, Loes, and other excavating equipment—Bucyrus-Erie. Thew, Lima, Byers., & A-1 Mechanic. Age 46. Now near Baltimore. Available April 1. Go anywhere in U.S.A. Box 9202

ELECTRIC SHOVEL OPERATOR

Operator of 120-B electric shovels wishes work anywhere in North or South America. References. Now located near New York City. Box 9203

OPERATOR AND SHOVEL FOREMAN

Twenty years with one employer operating shovels and in charge of pit is experience offered by this applicant. Has operated Erie and Bucyrus-Erie shovels including Gas+Air. Available immediately because of shutdown brought on by war. Now located Illinois. Box 9204

TO ADVERTISE: All advertising in this section is payable in advance. Rate: 60c per line, or $7.20 per inch of 12 lines. Minimum charge $2.40. No discounts; no commissions. If no change in copy is desired, three continuous insertions are offered for the price of two. Read these instructions carefully. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Count your own copy to save delay. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January issue closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

TYPE B Erie Steam Shovel, ⅞ yd. dipper, crawler mounting, 40' clamshell boom and clamshell bucket, in good operating condition. Box 2955

301 KOEHRING Shovel. Good operating condition. Located Indiana. May be available soon. Box 2951

FOR SALE OR RENT

OSGOOD ⅜ shovel compl. recond. General ½ shovel good cond. Model 20 Int'l tractor good cond. 8-Wheel Trailer 8.75x15 tires like new. 4-Wheel Trailer 9.75x20 tires good. Box 2945

3-T MONIGHAN DRAGLINE, Fairbanks-Morse Diesel Engine, 87' Boom, 3 Yard Bucket. Good condition. Located Indiana. Box 2946

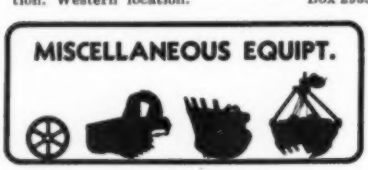
2-W Walking Dragline, good condition, middle west location, reasonable price. Box 2958

6-YARD MONIGHAN Walker 130' Boom, 4-cyl. Fairbanks-Morse Diesel Engine. Good operating condition. Located Indiana. May be available soon. Box 2950

3-YARD MONIGHAN Walker. Good condition. Located Illinois. Box 2949

320-B steam shovel truck wheel mounted 85 foot boom 54 foot handle 7½ yard dipper, reasonably priced, immediately available, location midwest. Box 2936

Will sell or lease used 5-W Diesel or continuously running main motor electric dragline new in 1935, equipped with 100 foot boom reducible to 80 foot and including 5 yd. dragline bucket. Machine was recently overhauled and painted and is in A-1 mechanical condition. Western location. Box 2938



FOR SALE

1½ YD., ROCK BUCKET, practically new; 12 tons heavy chain with hook and ring, A-1 condition; 1 drill sharpening machine; 10 double deck steel beds, sleeps 4.
A Brazos & Sons, Inc., Middletown, Conn.

ONE HOMELITE Portable, gasoline, 2 in. water pump, together with suction and discharge hose. L. F. Brownell, Biddle Street Extension, Warren, Pennsylvania.

CRANE BOOM

100-foot boom (4 25-ft. sections) for Model 700 P&H. Good as new—bargain $900.00. Inquire Kuesel Coal Co., City Hall Square, Milwaukee, Wis. Phone MArquette 1500.

THREE BUCYRUS-ARMSTRONG Model 29 Blast Hole Drills; caterpillar mounted; electric powered, 3 phase, 60 cycle, 440 volt; in running condition; with 6" string of tools; price, southern Illinois, $3000 each. Box 2957

BUCKEYE MODEL EH 2-drum hoist with adaptor for International "40" series tractors. Missouri-Illinois Tractor & Equipment Co., 510 Withers, St. Louis, Missouri.

FOR SALE

COMPLETE 1½ cu. yd. shovel front end for Bucyrus-Erie 37-B, up to Serial No. 15000, including boom, handle, dipper, and crowd machinery. Located Chicago. Available immediately. Box 2944

DIPPERS

⅜ cu. yd.—10-B—Drag shovel dipper
½ cu. yd.—16-B—Drag shovel dipper
½ cu. yd—18-B—Skimmer scoop dipper
¾ cu. yd.—20-B—Shovel dipper
¾ cu. yd.—20-B—Drag shovel dipper
1¼ cu. yd.—33-B—Shovel dipper
1¼ cu. yd.—GA-3—Shovel dipper
1¼ cu. yd.—{41-B, 42-B, E-2}—Shovel dipper
1½ cu. yd.—{41-B, 42-B, E-2}—Shovel dipper
2 cu. yd.—75-B—Shovel dipper
2¼ cu. yd.—50-B—Shovel dipper
2¼ cu. yd.—75-B—Shovel dipper
3½ cu. yd.—76-B—Coal dipper
5 cu. yd.—120-B—Shovel dipper (used)
6 cu. yd.—{200-B, 225-B, 320-B}—Shovel dipper
8 cu. yd.—320-B—Shovel dipper (used)

"FOR BUCYRUS-ERIE EXCAVATORS ONLY."

PARTS DEPARTMENT
Bucyrus-Erie Company
South Milwaukee, Wis.

2 5-yd. Clamshell Buckets suitable for ore handling. Located East Chicago, Indiana. Box 2956

FOR SALE

Dipper sticks and welded back dipper for Model 18 Northwest. Box 2954

SHOVEL EQUIPMENT FOR 52-B

27'6" boom, 18' dipper handle, 2¼ yd. rock type dipper. Also auxiliaries for 52-B diesel shovel service. Used less than 6 months. Box 2920

NEW ENGINES FOR SALE

4—Hercules Second Altitude Gas Engine—Model "WCX-3"—6 cylinders—4¼" bore x 4½" stroke—75 H.P. @ 1575 R.P.M. idling speed.
Further information will be gladly furnished upon request.
Write — Telephone — Wire
Parts Department
Bucyrus-Erie Company
South Milwaukee, Wisconsin

LIGHTING PLANTS

FAIRBANKS-MORSE light plant, one only, new, Model "A," 750 watt, 115 volt. Compound wound, direct current generator, driven by V-belt from single cylinder gas engine complete with special tank and hillside sump filler cap. Price: Net cash, F.O.B. Erie, Penn., $175.00.

BUCYRUS-ERIE COMPANY
Parts Department
South Milwaukee, Wis.

FOR SALE

Caterpillar 60 gasoline tractor. $1,750.
AC gasoline tractor, rubber, $750.
Caterpillar No. 10 gasoline Auto Patrol. $2,000.
Wisconsin 6-cyl. 120 H.P. gasoline power unit, complete. Mounted. $1,750.
B.E. 30-B gasoline 1-yd. dragline. $7,500.
B.E. No. 1035 gasoline 1¼-yd. dragline. $8,500.
This equipment in good working condition.
Clifford Waterhouse **Jackson, Mississippi**

10-B SHOVEL FRONT END

TWIN ROPE Crowd shovel boom, dipper handle and dipper suitable for Bucyrus-Erie 10-B, Serial No. 14761 or later. Located eastern Nebraska. Box 2953

Dragline bucket, 1¼ cu. yd., P&H, new.
Crushing plant, Iowa, jaws 12"x24", rolls 16"x24".
Trailer, heavy-duty, 12-ton LaCrosse, like new.
Martin County Nat'l. Bank, Fairmont, Minn.

WANTED TO BUY

Dipper and stick for old model type B Erie steam shovel No. 1012. Want ¾ cubic yard bucket. Give location and price. Grady Garms, Contractor. Little Rock, Arkansas.

½ YARD GASOLINE SHOVEL WITH BACKHOE ATTACHMENT. CASH BEFORE SHIPMENT. DUKE EQUIPMENT CO., 297 DUKE ST., MONTREAL, CANADA.

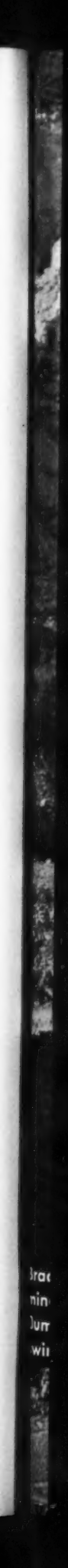
WANTED

CATERPILLAR Road Patrol No. 12. Chicago vicinity. Give full particulars when contacting us through Box 2952

One T-40 International tractor transmission housing. Sol, 95 Flat Shoal Ave., Atlanta, Georgia.

WANTED

Crane Boom. 25' to 30', for Model 200 9-Ton P&H truck mounted shovel inside measurement of boom foot mounting, 3'4½", 2" Pins. Box 2948

FAIRLEAD WANTED

Dragline fairlead for Koehring 301. Write Willy Boutin, 3281 Mont Joli St., Montreal North, Quebec, Canada.